AMERICAN FORESTS

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WAR CALLS COME FIRST

American Forests

Editor
OVID BUTLER

Associate Editors
LILIAN CROMELIN
ERLE KAUFFMAN

Published monthly by

THE AMERICAN FORESTRY ASSOCIATION

919 Seventeenth Street
Washington, D. C.

The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of its magazine—AMERICAN FORESTS—designed to keep before the people of the country important conservation questions and issues, the Association carries on educational programs in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. All its resources and income are devoted to the advancement of conservation in the interests of public welfare. All citizens are welcomed to membership.

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The Editors are not responsible for loss or injury of manuscripts and photographs while in their possession or in transit. All manuscripts should be accompanied by return postage. The Editors are not responsible for views expressed in signed articles. Notice of change of address for AMERICAN FORESTS should be received by the tenth of the month preceding issue. Entered as second-class matter at the Post-Office at Washington, D. C., under the Act of March 3, 1879. Acceptable for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized July 10, 1918. Additional entry at Baltimore, Md., December 29, 1931.

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Who's Who

Among the Authors in this Issue

FRANK HENIUS (*Oriente—New Empire of the Americas*), originally an export and import expert, gradually drifted from this work into writing. He has published several books on South and Central America — notably *Trade With Latin America* and *The ABC of Latin America*. Two things he loves — trees and the sea. He has lately made an exhaustive study of strategic materials in Latin America and his contribution this month deals with the natural resources of one fabulously rich section of the southern hemisphere,—the Oriente country of Ecuador and Peru, where so recently the border dispute of a century was settled by protocol.

Frank Henius

VIRGIL HEATH (*Detail in Alaska*), native Oregonian, was graduated by Oregon State College in 1937, since which time he has been stationed on the Tongrass National Forest, in Alaska, and on the Admiralty Division, with headquarters in Juneau. He has enlisted in the Navy, and is now somewhere in the Aleutians.

Virgil Heath

ELRICK B. DAVIS (*The Rediscovery of Wood*) is a special writer on the Public Relations Staff of American Forest Products Industries with a broad background as feature and editorial writer and critic. He has taught journalism at a number of leading colleges and the Medill School of Journalism at Northwestern University.

GRACE V. SHARRITT (*Try Your Hand With Wood Ducks*) free-lances from Detroit. A nature lover, she writes with feeling and understanding of the things of the outdoors.

MORA M. BROWN (*Lost Sanctuary*), of Riverside, California, is—by her own confession — "a homemaker who likes to write." Living in the West and married to a civil engineer, she contributes regularly to current newspapers and magazines.

CHARLES F. EVANS (*A Saga of Southern Pine*) is one of our first-line foresters, with a broad knowledge of and experience in the forests of the South. A graduate of the University of Wisconsin and of the Yale Forest School, Mr. Evans entered the Forest Service in the West, serving first in Idaho. Transferred to New Orleans in 1927, he has served in several important posts and is now stationed in Atlanta, where he went in 1934 as Assistant Regional Forester.

Charles F. Evans

CHARLES ASKINS, JR. (*Squirrel Up a Tree*), outdoorsman and hunter all of his life, found—at eleven—squirrel hunting his favorite pastime. He grew up with a deep liking for firearms and for many years was the top ranking pistol shot of the United States, winning major titles and holding a number of world records. Recognized as a leading authority on small arms, he is now overseas serving his country as a first lieutenant in the Ordnance Section.

Charles Askins, Jr.

HILLIARD HENSON (*Why Incendiary Fires?*) is Sunday or feature editor of the Asheville *Citizen* and the Asheville *Times*. Born in Western North Carolina, his first job was on a newspaper at Brevard, on the edge of the Pisgah National Forest, and on his way up he held down news desks on the Raleigh *Times* and other North Carolina papers.

THE COVER—The *Ranger I*—of the Forest Service fleet, lying quietly at anchor somewhere in Alaska. The setting, with an ancient totem carving in the foreground, is one of unequalled pristine beauty.

THE GHOST FOREST

By
H. B. HINMAN

•

Along the rugged mountain slopes,
The gray ghost-forest stood,
Where racing fires had killed; not burned,
When they destroyed the wood.

The years have broken, weathered them:
Like skeletons, they stand,
With spectral arms that reach the sky,
A grim, defeated band.

THE BATTLEFIELD

Across the battlefield they lay,
The corpses that but yesterday,
Were monarchs of the forest, —where
The raging fires had felled them there.

As they disintegrate and rot,
This ground becomes a hallowed spot,
And vines will come and cover them;
Soft winds will sing their requiem.

Hinman Glacier and Peak in Snoqualmie National Forest were named in honor of the writer of these verses, Dr. H. B. Hinman, of Everett, Washington, who was for many years an enthusiastic mountain climber and conservationist. Now a shut-in, paralyzed — due to an accident, he relives — in his writing — experiences of former years among the mountains and forests he knew and loved so well.

BIG TREES

The American Forestry Association is sponsoring a national hunt for the discovery and preservation of the largest specimens of the different species of typical American trees. Locate, measure and nominate your candidate in this competition. ACT NOW to make known and save the largest specimens of America's trees. For further details, send for the Association's special announcement of this Big Tree hunt. Mail your nomination with records and pictures to The American Forestry Association, 919 17th Street, Northwest, Washington, D. C.

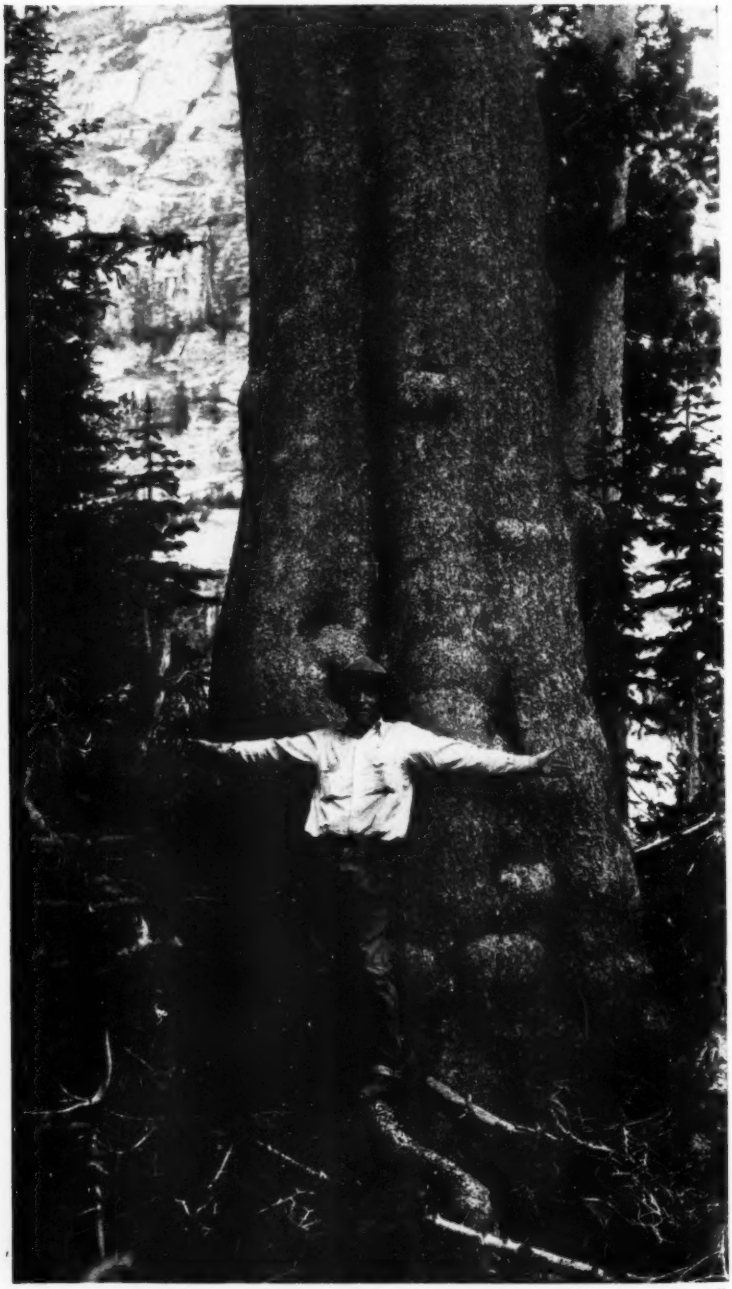
CHAMPION WHITEBARK PINE

HERE is a real champion, for the whitebark pine, *Pinus albicaulis*, Engelmann, a dweller of high places, and subject to unabating winds, usually develops a thick, squatty form which with age may become distorted.

This magnificent specimen, located in the Grand Teton National Park, Wyoming, is therefore a real discovery. Nominated by Charles J. Smith, superintendent of Grand Teton, the monarch has a circumference of eighteen feet and two inches, four and a half feet above the ground. Its height is eighty-five feet, the first limb branching out thirty-four feet from the ground. It has a crown spread of sixty feet. All measurements were made in 1941 by Chief Ranger Hanks and Park Ranger Davis.

The great tree is located in Cascade Canyon, at an elevation of 8,600 feet above sea level.

Erect and sound of trunk and limb, with crown well formed and root system healthy and secure, the magnificent and unusual pine is growing in association with Alpine fir and Engelmann spruce.



Big Whitebark Pine on the Teton National Park — Crandall

THREE months on the way, a letter from a camp of Polish prisoners in Germany has finally reached the editor. It comes from Captain Michael Bernakiewicz, who writes in part: "There is in this camp a large group of Polish officers, prisoners of war, students and engineers in forestry. Most of them have taken advantage of their captivity and have learnt sufficiently well to make themselves understood and to read books without any difficulty. Having acquired this knowledge of English, they wish now to complete their studies in their own profession, using English books and other material for this purpose. They would be very glad to acquaint themselves with U. S. A. forestry, which is almost unknown by them. They, therefore, kindly request you to send them some magazines on forestry, and books on the following subjects: North American forests and forestry, forest policy, utilization, taxation, management, economics of forestry and silviculture."

This is a worthy request and one which offers Americans an opportunity to make a direct contribution to the educational rehabilitation of Europe. A copy of Captain Bernakiewicz's letter was submitted to the International Committee of YMCA's—War Prisoners' Aid to confirm the merits of the request. In reply the Committee states: "This is one of two of the most important camps for Polish prisoners in Germany. Interestingly enough, in these camps the intellectual life of the Polish nation is being maintained at a moment when in Poland itself no educational work beyond the grammar school is permitted in the Polish language. The last specific information we had from this camp was to the effect that there were courses in 121 different subjects being offered in the university. This is sufficient evidence of the importance of the educational effort being made by the Polish officers in Germany and we, therefore, heartily endorse the request which is made by Captain Bernakiewicz."

Americans who have forestry magazines and books which they wish to contribute to the camp may send them in packages not exceeding four pounds in weight, marked "printed matter" and addressed to Captain Michael Bernakiewicz, Kriegsgef—Officierlager, VII A, Block A 2, Deutschland (Allemagne); or they may be sent to the War Prisoners' Aid of the YMCA, 347 Madison Avenue, New York City, which will ship them as shipping space is available to its Geneva office from which they will be distributed to the Polish prisoners.

* * *

FEW people realize the part rubber plays in moving the billion of feet of logs now going into the war effort. The first step in this movement, of course, is cutting the trees in the woods and transporting the logs from woods to mills where they are sawn into lumber. Most of the mills are from one to fifty miles from the points where the logs are cut. In years not long past transportation of logs from woods to mills was by horses, flumes or railroads. Today the picture is greatly changed due to the increasing introduction of trucks operated by gasoline and cushioned with huge rubber tires.

From information available to it, the U. S. Forest Service recently estimated that from seventy-five to eighty per cent of the logs—small and large—which are now being cut in our forests are hauled some part of the distance between the woods and the mills by trucks. The average truck haul as approximated by the Service is given as fourteen miles. When one considers that our war effort is expected to require thirty-three or thirty-four billion feet of lumber this year and that the logs necessary to produce this huge amount of sawn wood will weigh around 125,000,000 tons, the load which rubber is carrying in this one remote sector of our war activities becomes most impressive. It helps to drive home how dependent upon rubber every part of our American economy has become and how essential the conservation of rubber is to the winning of the war.

* * *

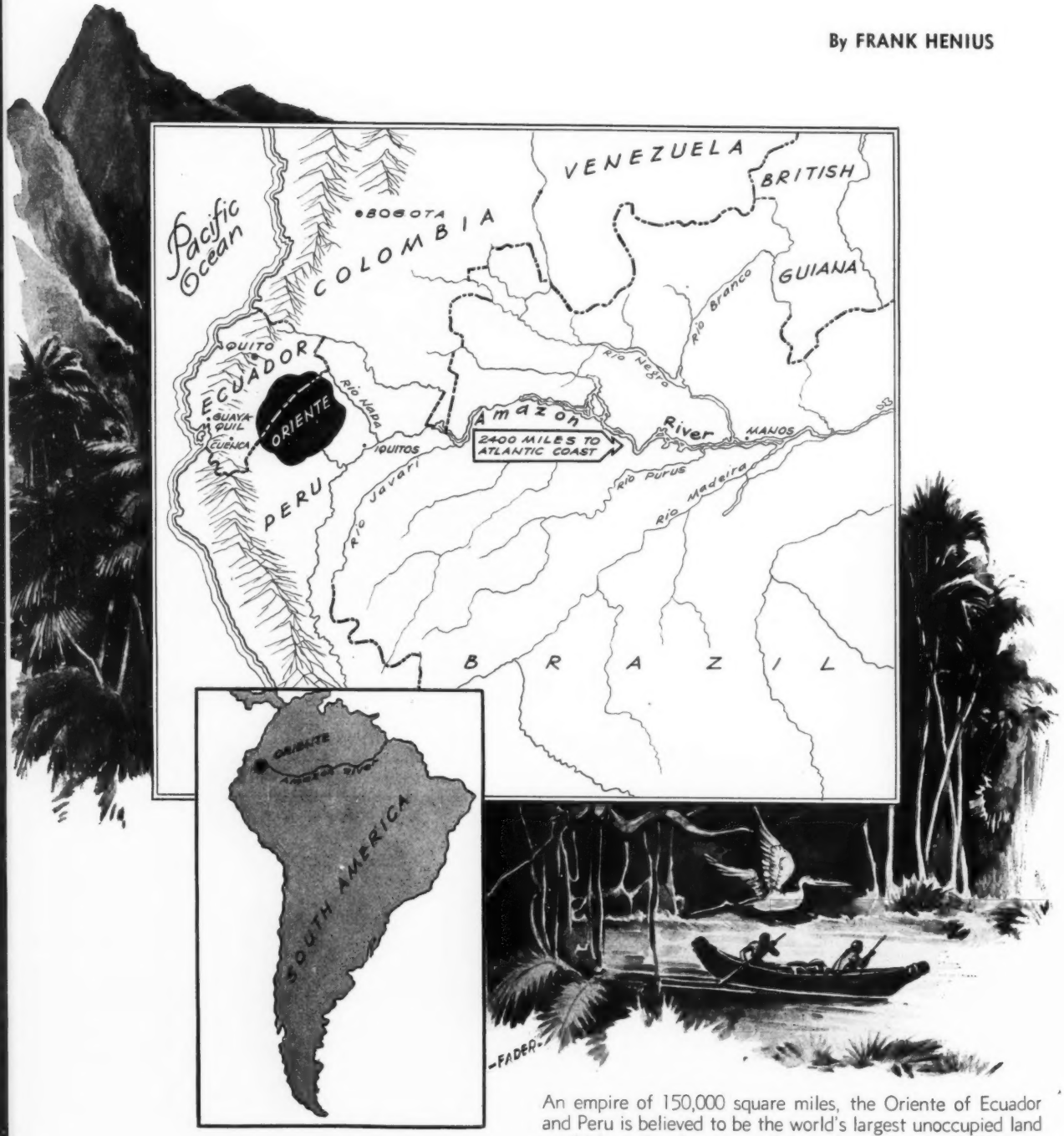
Executive Order 9213, signed by the President on August 4, reads as follows: "By virtue of the authority vested in me as President of the United States, I hereby extend the existence of the Quetico-Superior Committee, created by Executive Order 6783 of June 30, 1934, for a period of four years from July 30, 1942, to June 30, 1946."

This is heartening news. The Quetico-Superior Committee was originally set up to further the plan of creating an International Forest embracing the lake and forest lands of northern Minnesota and southern Ontario. Its continuance at this time not only raises new hope for the ultimate success of this worthy project, but further cements our relationship with Canada.

Ovid Butler

ORIENTE—NEW EMPIRE OF THE AMERICAS

By FRANK HENIUS



An empire of 150,000 square miles, the Oriente of Ecuador and Peru is believed to be the world's largest unoccupied land available today for successful settlement and development

THE FABULOUS ORIENTE, VAST STOREHOUSE OF RESOURCES, UNLOCKED FROM THE ANDES TO THE AMAZON

ON THIS very hemisphere, in this America which global war has welded closer, there are still almost unbelievable opportunities for exploration and development. Riches, success and adventure — the fruits of pioneering—are beckoning this very day. More important, material resources needed for winning the war, and in any post-war world picture, are within reach. For one of the fabulously rich territories of the Western Hemisphere has at last been opened to enterprise.

This treasureland is the Oriente, the region on the eastern slopes of the Andes which Ecuador and Peru have disputed for more than a century. Only this year, at Rio de Janeiro, was its borderline defined, thus opening the area to development. In the past, neither government nor private enterprise could be induced to devote time, money or effort to the unlocking of its resources. No one would risk men and money, machinery and equipment in a country where ownership and rights were so vigorously disputed.

The tropical forests, jungles and waterways of the Oriente, an empire of more than 150,000 square miles, reach from the Andes down to the Amazon. The rivers are the only highways through this vast territory. In Peru, the Oriente lowland is so completely shut off from the rest of the republic, except by air, that it might well be on another continent. This fact, even had it not been for the border uncertainties, largely contributes to delay in its exploitation. The Republic of Ecuador had an additional, and very important, reason for not developing the region it claimed: without the right to use the river system of the Amazon, it had no outlet from the Oriente to the Atlantic Ocean.

Prior to the settlement at Rio, Ecuador felt that its boundary should follow that of the old Spanish Presidency of Quito. Peru wanted to confine its rival republic to a narrow strip along the coast of the Pacific. As a result of this amicable and final settlement at Rio, Ecuador will own 30,000 square miles of the disputed area as well as the rights to free navigation on the Amazon and its tributaries. Peru, at last, will be able to develop its northeastern territory.

This protocol will prove of greatest importance not only to the two nations involved, but to the outside world as well, for it opens up a storehouse of immense wealth. If those who have evaluated this part of South America's vast unexplored country are correct, all the dreams and conquests of the old Spanish adventurers will pale before its treasures. Not in pure gold and silver, though both are known to exist in the Oriente, but through the development of a varied and rich treasure-trove of minerals and forest products. Cut off from the Pacific by the Andes, from the Atlantic by a river journey of 2,400 miles, this area is believed by many to be the

Eastward beyond the Andes lies the Oriente

Severin—from Three Lions

The rivers are the only highways in the Oriente — and all lead into the great Amazon where it begins its 2,400-mile journey eastward to the Atlantic Ocean

world's largest unoccupied land available today for successful settlement and development. The very fact of its known potential riches, in forest and mineral products, as well as in waterpower and land, has made the contending countries so anxious to possess it.

And its development may be speeded by wartime needs of the Oriente's strategic materials. It may be speeded also by new means of jungle penetration, brought about by jungle warfare. It has been shown, on the Malay Peninsula, that trucks preceded by tanks can make their way through heavy, unexplored, roadless tropical forests. They carry men, food, medicines, equipment — in short, everything needed for such an expedition. Too, new means of planting and mining, the advanced stage of geophysics and agriculture, can open up and harness the earth and all that it contains or produces much quicker than ever before.

The Amazon River, with its basin of 2,700,000 square miles, is said to have its headwaters in Peru, in the form of the Maranon branch. Flowing northeastward through that country, and breaking through the Andes, the river unites with the Huallaga. Both are joined by the Ucayali, all navigable rivers and all forming part of the upper waters of the Amazon. The tropical forests traversed by these streams form the northern section of the Peruvian montana, or eastern lowlands — the Oriente. The Maranon joins the Amazon near Iquitos, Peru's tropical river port, to the east of which, on the Ecuadorian side, in the Oriente, are the rivers Tigre, Pastaza, Morona, Paute and Zamora, from east to west. These rivers flow leisurely through jungle and forest, then race in swirling eddies down gorges and valleys and through country which is practically uninhabited except for Indians.

Along the river banks may be found haciendas and small settlements, but the little known wilderness is just beyond, often a few hundred yards from the streams. Trails may lead from one river system to another, but most of these are so overgrown by jungle vegetation that only Indians can follow them. Also, only Indians can find subsistence along these trails through their knowledge of edible plants and roots, berries and nuts. Because they pass through the forest silently, they can kill sufficient game for their daily needs with arrows from bow or blow-gun. A white hunter would likely walk for hours without a chance to shoot, for the animals are hidden in the thickets and the verdure. Only insects are noticeable and plentiful. Two of them, the sandfly and the mosquito, are real tormentors. Ants occur everywhere and will do damage if precautions are not

taken against them. The Indians use some of the insects for food; they toast, for example, one large ant, which has a pleasant nutty flavor. They also consider certain grubs edible. Wild bees are plentiful and their honey is much sought after.

There are two kinds of soil in the Oriente, the alluvial or flood plain soil and the upland soil. The former is generally silt loam, overlaying a sub-soil of sandy river bed deposits. The inundations of these alluvial soils, occurring on the banks of the many rivers and the plains and terraces behind them, maintain the fertility of the land. It is well adapted for planting rice, corn and cereals, as well as for certain grades of cotton, tobacco and cacao. The upland soils are the forested regions of the Oriente, and it is interesting to note, in view of the present rubber situation, that as far back as 1925 two soil experts of the U. S. Department of Agriculture stated that the upland soils of the Peruvian Amazon country are characterized by looseness and more toughness in consistency of the material below the three-foot level than soils of the Brazilian Amazon valley. This may well prove a very important fact, from a strategic as well as industrial point of view. The most common texture is loam, with sandy loam in prominence; silt loams and fine sandy loams also occur in the generally undulating to sharply rolling country. While much of the territory is unexplored, it is known to be extremely rich in such minerals as gold, silver, copper, coal and iron. Too, it contains many important deposits of such strategic materials as tin, tungsten, platinum, manganese, chromite, mercury, mica and vanadium. There is also much valuable oil.

Severin—from Three Lions

The Oriente's forests are varied, dense. Here is a typical native woodcutter

Severin—from Three Lions

Small native settlements are found along the river banks, but the little known wilderness is just beyond, often only a few hundred yards from the streams

Vegetation varies in the upland country and along the alluvial river banks. On the latter the characteristic balsa trees predominate. Balsa wood, of great lightness and strength, is used to transport men and goods down the rivers and, at the end of the journey, is broken up for firewood. With a lesser specific gravity than cork, it is invaluable for airplane and marine construction and is, therefore, a vital war material. It is also used for insulating and similar purposes. In the upland regions there is a great variety of native trees, palms and undergrowth.

Seen from the rivers, the forests of the Oriente show a dense undergrowth, from which trees and palms rise to heights of from eighty to a hundred feet. Lianas hang in festoons from tree to tree, generally in such abundance that even dead trees are upheld and supported until rotted away. Parasitic plants, including orchids, climb to the top of the trees. Here and there a real giant, perhaps a cedar, will raise its crown to a height of from 120 to 150 feet, while graceful, slender palms provide the proper tropical atmosphere. Indeed, the variety and characteristics of the trees are great and their names alone seem to spell the jungle and adventure.

There is the Oriente's mahogany, which in truth is not a genuine mahogany but *caoba aguano,* very similar in appearance and hardness of its wood. Among the great cedars are the white, pink and red. The white is soft and pliable and therefore more desirable, especially to boat builders. Jungle red cedar is harder and has a less attractive surface.

There is the *itauva,* the Indian equivalent for stone tree, which is known as the "King of the Woods" for naval construction. It has a very close texture and great resistance to decay. In appearance, color and durability, it compares favorably with teak, the shipbuilder's favorite. In the Amazon River country it is used in the manufacture of various kinds of river crafts, as it can be easily worked.

Huagapu, a middle-sized tree which insects will not attack, has a hard, heavy wood which might well serve for flooring and other construction work. *Marupa* is the name of a tree with light, white wood. Because of its bitter taste, ants pass it by, which fact suggests that it is very useful for boxes as well as for termite construction. *Palo de sangre,* as its name indicates, has a heavy wood of deep blood-red color, and while it seems to be almost indestructible it has a twisted grain and is not easily worked. Commercially, therefore, it is not very useful.

Among the palms, the *chambira,* with fruit as large as eggs, yellowish red and edible, furnishes an excellent cooking oil. From its leaves comes a fibre known as *tacunu,* which is used widely by the Indians for rope—rope stronger and more durable than hemp. In view of the hemisphere's temporary loss of Manila imports, *chambira* should prove very valuable in the years ahead.

The high crowns of *hunguragua* pierce the tree ceiling with their cluster of fruit, each the size of a prune. Oil from this fruit serves as a substitute for olive oil and the nuts are nutritious and tasty. *Javari,* common on the river terraces, produces an edible oil and fatty nuts which, when ripe, become very hard and, as *tagua,* or vegetable ivory, are used for making buttons, ornaments and similar objects. The leaves of this palm contribute an excellent fibre and also serve as local roofing material. *Huicungo,* with long spines on its trunk, has egg-shaped fruit producing good oil from the nut, just like the palms known as *chapaja, inchabi* and *conta.*

One of the most beautiful palms is the *aguaje.* Growing abundantly in swampy land, it has large, fan-shaped leaves, and its fruits, two inches long, are eliptical and appear to be covered with glistening scales. While the dried nut is very hard, the pulp is pleasant to eat and is sold in the streets of Iquitos. The *pijuayo,* a slender palm raising its head high over the lower forest trees, carries its fruit in clusters weighing up to a hundred pounds. The pulp of the fruit, which is the size of a small egg, serves as an excellent food when boiled.

These are the most common palms of the Oriente, but only the *pijuayo* is cultivated by the natives, because it provides them with an important winter food supply and furnishes a fermented drink known as *chicha pijuayo,* a great favorite. Some of these palm oils, owing to the situation in the Dutch West Indies, India and Malaysia as well as Africa, have become vitally important. And these supplies may be increased by some of the oil-bearing nuts and vines which in certain sections of the Oriente appear in great abundance. Foremost among these is the *habillo,* often encountered in the forests, with fruit as large as an oversized orange and containing a number of flat oil-bearing seeds. This oil, mixed with animal fat and caustic soda, is used locally in the manufacture of laundry soap.

In the Oriente are found many fibre producing plants in addition to those already mentioned, such as the *pissava, kapok, plantains* and *bombonaje.* There are other plants which are at present used by the Indians for making waterproof and sunproof dyes. One very important and valuable addition to the world's health is the great number of medicinal plants and herbs in the Oriente. The *cinchona* tree, source of quinine, and the coca shrub, from which cocaine is derived, are both indigenous to the eastern slopes of the Andes. *Barbasco* grows in the Oriente and the root of this small tree, when pounded into a pulp and thrown into a stream, drugs the fish, allowing them to be caught easily. It has, no doubt, medicinal values and properties. Many other roots, berries, herbs, leaves and flowers which the Indians use for medicinal purposes will unquestionably add to the world's store of drugs.

Animal life in the Oriente is not abundant. There are a few spotted jaguars, called "tigres" by the natives, wild hogs of three different species, and tapirs. But the rest of the mammals consist merely of deer, monkeys and various ro- (*Continuing on page* 426)

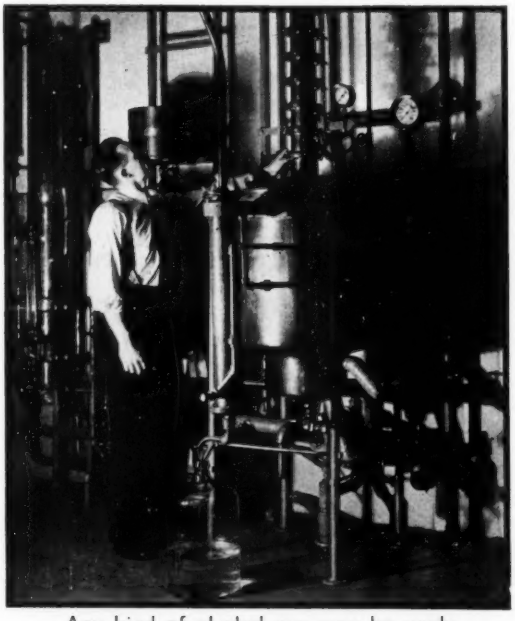
THE REDISCOVERY OF WOOD

Chemistry Opens a World-wide Frontier of New Products Obtainable From Wood

By ELRICK B. DAVIS

CLAD in fabrics produced from wood; living on wood sugar, wood proteins, and meat and cheese from wood-fed cattle, with a schnapps ration made from "grain" alcohol obtained from sawdust —German soldiers move to the Russian battle lines in woodgas-driven trucks which are greased with tree-stump lubricants and run on Buna tires made from wood alcohol.

Spreading misery and destruction with explosives manufactured from the waste liquors of woodpulp mills, they are assisted in their nefarious work by squadrons of plywood planes, while the German propaganda division takes a motion-picture record of selected items of the action on film made of wood cellulose acetate.



Any kind of alcohol can now be made from wood. Here is a still in action

According to Dr. Egon Glesinger, secretary general of the *Comite International du Bois* (International Timber Committee), now in this country, European shortages of raw materials and Nazi war demands forced the Germans to look at wood with new eyes. For 5,000 years the world at large had been satisfied to use wood either as raw beams and boards or as raw fuel. Fifty per cent of the wood content of the trees reduced to lumber was wasted in the process of making boards. Ninety-two per cent of the thermal value of wood used as fuel went up fireplace chimneys. Hitler could not hope to wage successful war if such wastage continued.

Says Dr. Glesinger, "Germany is now employing a revolutionary resource-use theory in the War of Materials between the Axis and the United States. Hitler and his staff were well aware that if they launched a major war, this country, whether it joined the war as an anti-aggression belligerent or not, would willy-nilly become the arsenal of those who resisted Nazi conquest. Germany's disastrous deficiencies in food, motor fuel, and clothing in the face of American supplies in 1918 were still a raw wound in German memory.

"In 1936 Hitler made Hermann Goering chief-of-staff of a four-year plan designed to build and integrate a Reich network of industries which would supply Germany with all its essential needs, to be made from the raw materials within Germany or within 'the European space.' Exhaustive survey of industrial potentialities led Goering to have himself made *Reichforester*. 'To be without wood in time of war,' he said, 'is almost as bad as to be without bread.' Because of its versatility wood was made the backbone of the German four-year 'ersatz' plan.

"Wood is known in Germany today as *'Universalrohstoff'* — the material of which anything can be made. Goering's surveys found here and there industries based on wood which already ignored wood's traditional use as sawn lumber and as fuel. Making paper from woodpulp had started in Germany in 1840. Advanced by inventions in France, England and the United States, papermaking from wood had become a world industry. Making fabrics from woodpulp had started before the last war. But these fabrics were then so inferior that attempts to clothe the German army in them in 1918 had proved a tragically comic failure. Charcoal burning, the basis of wood distillation, had started as a pre-historic method of making a more efficient fuel than raw wood. Isolated developments were beginning to make use of the by-products of the charcoal-making process as various chemicals. But the forest indus-

tries as a whole had not seen the promise in these developments. Under Goering's direction Germany's research scientists were turned loose on wood with instructions to ignore its traditional uses and to explore the chemical constituents of trees.

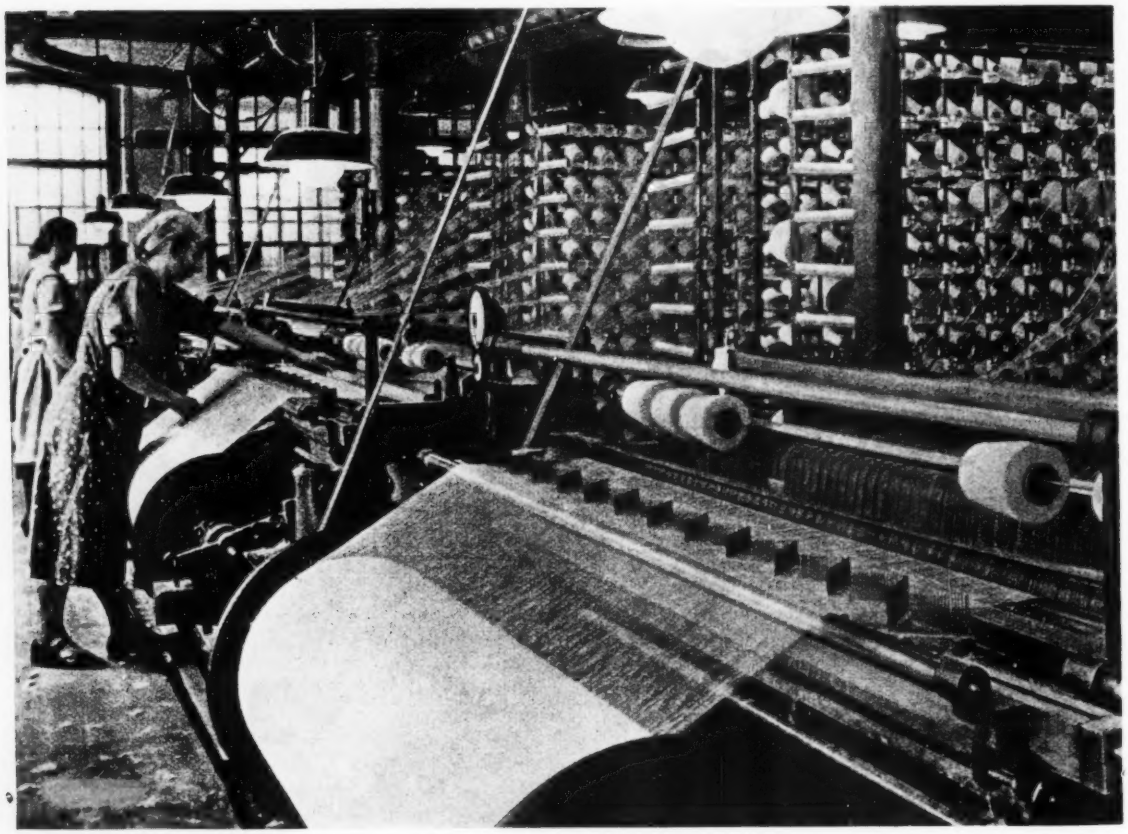
The essential ingredients of wood are cellulose and lignin. Cellulose is found in its purest form in cotton, and cellulose and lignin together occur in almost all plants; but wood is their cheapest and most abundant producer. One acre planted to trees and harvested on a sustained-yield basis will produce several times as much harvestable cellulose every year as will an acre planted annually to cotton.

Present German wood usage is based on the discoveries that wood cellulose and lignin can provide food for both men and beast; replace oil both as motor fuel and lubricants; be transformed into fabrics which can satisfactorily replace the traditional silk, cotton, linen, wool, and jute for almost all purposes; and provide a staggering variety of industrial, medicinal, and domestic chemicals, as well as materials for an expanding range of construction and fabrication for which raw wood is not suited. In addition, raw wood itself can be technologically improved for use either as builders' or artificers' material or as fuel.

Nature makes cellulose by joining together molecules of glucose—the kind of raw sugar that makes corn sirup. The fiber of a tree is cells of cellulose. They are bound together by lignin, a staunch and durable material still chemically somewhat obscure. Without that binder a tree would be no stiffer than cotton batting. In its raw state, once freed from the cellulose it serves as mechanical support, lignin runs the mechanical gamut from plastic glues to plastic hardware, even taking the place of strategic metals to make bolts, washers, and gears.

The process by which cellulose is separated from lignin, and both of these materials are put through their amazing repertory of chemical tricks, is called hydrolysis. Various acids applied to raw wood start the chain of industrial transformations.

According to Dr. Glesinger, one of the neatest of these tricks is the alchemy which changes sawdust into sugar. Since cellulose is glucose, it can be changed into any form of sugar desired, from sirup to alcohol. Over twenty European wood sugar factories, extending from Germany through Sweden, Finland, Norway, all Central Europe, and the Balkans, are making raw



Even before 1938, when this picture was made, German mills were producing wood fabric, and last year every person in the Reich was provided with a total of ten pounds of rayon and staple fibre

Wood pulp being refined preparatory to making cordite — a high-propellent explosive. Smokeless powder, nitroglycerine and other explosives are made from wood alcohol

sugar from sawdust and other wood wastes. The wood sugar thus made is indistinguishable from the ordinary sugar made from sugar cane or beets except for one reason—wood sugar is dietetically fit for diabetics.

Much of this hydrolytic wood sugar is not refined into sugar granules for home consumption, but left as glucose, he points out. From this, "grain" alcohol is made. All German schnapps, and more than half of Sweden's current beverage spirits started life as wood. Wood molasses dresses German pancakes, and enriches cattle fodder throughout Europe.

Proteins are a vital element in human nutrition. Lack of them reduces the body's resistance against tuberculosis. This is the chief reason why in every war the tuberculosis death rate rises sharply. One of the most concentrated and durable forms of protein is obtained in Germany by producing yeast from wood glucose. This yeast contains fifty-five per cent pure protein, as much as good beef. Germany's annual production of wood protein is already greater than 100,000 tons—enough for the protein ration of the entire Nazi army.

Europe, and especially Germany, says Dr. Glesinger, suffers from a permanent deficiency of meats and fats. In war the shortage becomes acute through lack of imported cattle fodder. Mass slaughter of livestock has resulted, as in Denmark after the Germans took over that country. Since the war was not as quickly won as Nazi plans had forecast, wood was called to the rescue. Trees provide cattle fodder in two forms. Not only does raw sugar molasses and protein yeast manufactured from sawdust enrich straw and other low-grade animal fodders, but overcooked wood cellulose forms a white powder equal in nutritive value to oats. Sweden is currently producing about 400,000 tons of this fodder-cellulose a year. Similar manufacturing plants are in operation all over Nazified Europe.

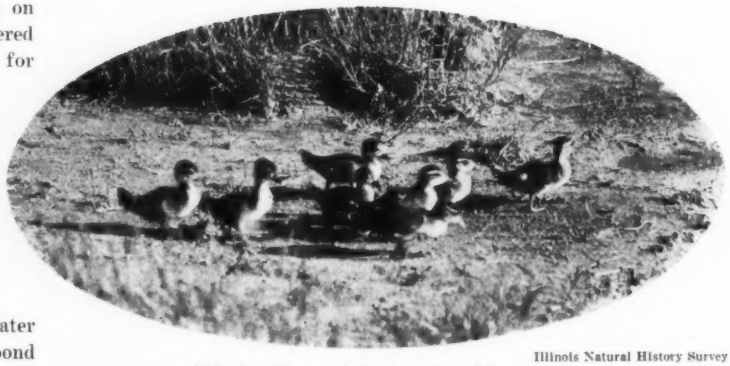
Any kind of alcohol can be made of wood — medicinal or beverage ethyl alcohol, the industrial alcohols, as well as the highly poisonous methyl "wood" alcohol.

Ethyl alcohol added to low-grade gasoline makes it a high-grade motor fuel. The waste liquors of the 6,000,000 tons of sulphite-process wood pulp manufactured by European mills are no longer dumped into the rivers but retained and concentrated. Their alcohol yield has been (*Continuing on page* 418)

TRY YOUR HAND WITH WOOD DUCKS

By GRACE V. SHARRITT

HAVE you a pond or a stream on your place? Have you ever considered diverting this natural water supply for uses other than a trysting spot for turtles or spring peepers? Maybe the pond is just an old mudhole, or a piece of so-called worthless swampland, nevertheless, wood ducks will consider the site when you encourage breeding of these most beautiful of waterfowls.



Illinois Natural History Survey

Week old wood ducks, raised by a domestic hen, looking for water

If your acreage is without water construct an inexpensive artificial pond of good concrete as Jack Miner, the noted Canadian naturalist and lover of waterfowl, has done for his successful population of wood ducks on his two hundred-acre Ontario farm and wildlife sanctuary near Kingsville. No matter what your water situation, do not let another season pass without at least one clutch of eggs as a nucleus for a future flock of the ducks that like to paddle their feet in water, but rear their young in trees.

Although the breeding of wood ducks may seem superficially an unnecessary fad during wartime, yet that supposition is not true. For the propagation of this wild creature, once almost extinct, is a real contribution to conservation of the nation's waterfowl. Aside from doing a fine service to the country, there is also a great morale value in working with the beautiful, in helping to create a better future.

The male wood duck is the most brilliantly colored duck in North America, with a coat like changeable taffeta and a smart green crest shading into burgundy. His little lady is a modest dame, as behooves the female in the bird world. Her chief identification mark is a round, white eye-ring which gives her a sort of dewy, wide-eyed look. These two, male and female, come spring, start their plans for homemaking from late March through the month of May, dependent upon their location. Wood ducks breed from the Gulf of Mexico to Southern Ontario. Rarely do they winter south of Virginia or southern Illinois.

To attract wild ducks to your haunts you can begin with tame decoys of your own breeding. Decoys should be wing-clipped. Eggs, which can be purchased from reputable game-breeders, may be incubated beneath a setting mallard's bosom, or any common domesticated duck, or even a bantam hen. Six or eight eggs are about as large a clutch as a hen would care to manage. According to game-breeders,

U. S. Fish and Wildlife Service

Wood ducks like to paddle their feet in water, but rear their young in trees. The male, at right, is the most brilliantly colored duck in North America

it takes about thirty days for incubation.

Remember, however, the distraction of the fairy-tale hen with her gosling children, who insisted in running away to the water, before you undertake adopting a bantam hen as parent to wood ducks. A duck mother is better able to handle such matters. Food, too, is a simpler problem with a mother whose ancestry and habits are somewhat the same as her foster-children's. Ducklings need clean shallow water and sand. Chopped lettuce and duckweed are good supplementary foods, added to mash and chopped earthworms.

The interest of wood duck experimenting reaches its peak when you can lure the wild ducks winging in the skies during spring migration to the nesting-boxes which you have established on posts or trees near your pond. The tree ducks, as the wood ducks are also called, can then raise their families as nature intended they should.

Hollow trees were the old-time homesite favorites of this species. But as hollow trees are almost a by-gone memory, artificial wood duck cottages are now universally set up "for rent" to attract the tree-nesting ducks. Dr. Miles D. Pirnie, wildlife director of the W. K. Kellogg Bird Sanctuary at Battle Creek, Michigan, declares that a wood duck will nest almost any place on a farm near the water if the location is in the right zoning area for ducks. A wood duck's natural habitat is wooded bottomlands and streams. At Wintergreen Lake, site of the Kellogg Sanctuary, the ducks go to housekeeping in almost any sort of nesting-box. Even the mailboxes on the place are not sacred to the United States Rural Delivery, and many's the time an over-zealous Madame Wood Duck has tried to cheat the government and acquire a housing-project all her own.

Illinois Natural History Survey

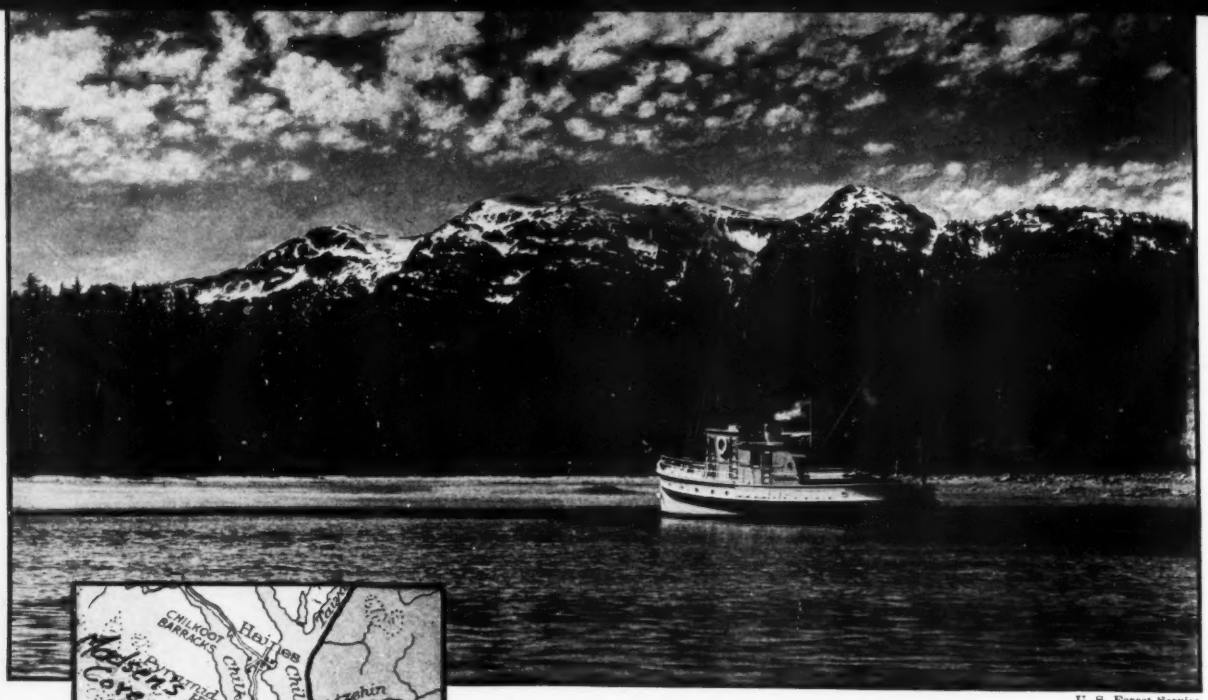
Nesting boxes, such as this, placed near food, cover and water, lure the wild tree ducks during spring migration

However, for the best purposes of the beginner in wood duck breeding it is well to build homes according to correct specifications and to lure the beauties from the skies with all the tricks one can conjure, such as ample planting of wild duck foods. For cover, plant reeds and rushes, such as bur reed and reed grass. This grows best in lowlands or in waters to a depth of twelve or eighteen inches. Pondweeds and duck potato make excellent foods. Aquatic nurseries will advise you on the best kinds of plantings for your particular marsh or stream.

The most successful type of dwelling for the tree duck at Jack Miner's is a home designed of red-clay tile. The upright tile is about two feet tall. To this, which has a front opening, another smaller vertical tile is cemented which makes a sort of hall. Mr. Miner has a permanent wood duck population of around fifty birds; about two hundred young ones took wing this past fall for southern wintering places.

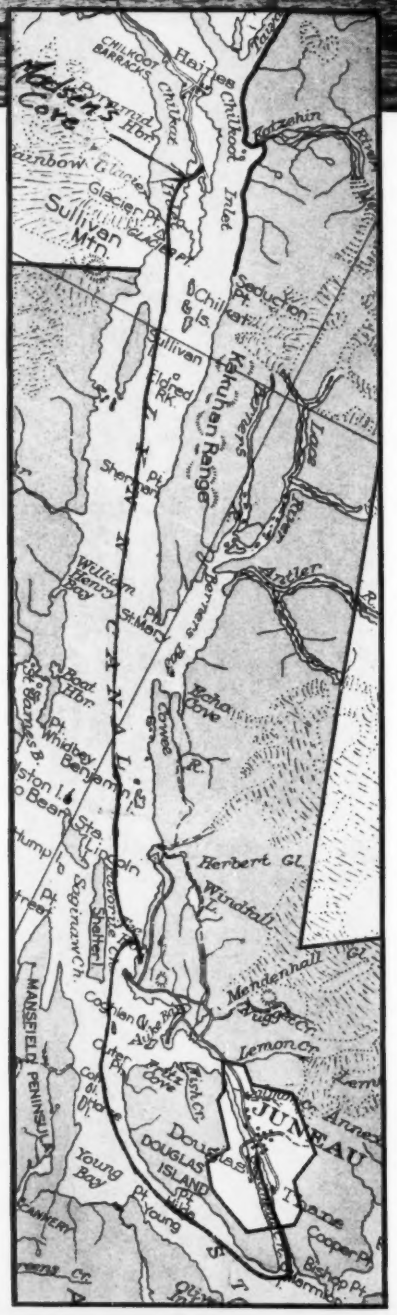
One of the most extensive researches of wood duck breeding is that of the Illinois Natural History Survey. The Survey is constantly improving and changing the type of dwellings established along a six-mile stretch of the Illinois River in the famous waterfowl bottomlands of the midwest.

The 1942 house designed (*Continuing on page* 432)



U. S. Forest Service

"The Forester" — flagship of the Service fleet, lying quietly at anchor on the Tongass, in Southeastern Alaska. At left, Lynn Canal, scene of her victorious battle with a November blizzard


Haines
Chilkoot Inlet
Sullivan Mtn.
Kehuhan Range
Lynn Canal
Antler
Herbert Gl.
Windfall
Mendenhall Gl.
Lemon Cr.
JUNEAU
Douglas
DOUGLAS ISLAND
Young Bay
Thane
Cooper Pt.
Bishop Pt.
MANSFIELD PENINSULA
Point Louisa
Point Young
Point Retreat
Point Whidbey
Point Benjamin
Point Lincoln
Point Arden
Point Astrida
Point Stephens
Point Bridget
Point Hilda
Point Anne
Point Arrecife

fested with islands and reefs and without a single good winter anchorage for small boats. Winter winds and storms rip up and down the canal as though in a funnel. It is the last place small-boat captains and crews want to go.

On November 22 we weighed anchor and pulled out of Juneau, optimistically intending to make the run to Haines without a stop. As is so often the case, however, and especially in Alaska, intentions are one thing, actualities quite another. We had hardly rounded Douglas Island and pointed the nose of the *Forester* up the canal when a howling sou'wester overhauled us, forcing the skipper to hunt shelter in a small inlet only thirty miles from home base. This inlet, labeled Tee Harbor, looks good on the map. The "harbor" part of it, however, is nothing more than a draftsman's dream. As a place to hide from a strong sou'wester, Tee Harbor offers little more protection than the open channel.

The wind, continuing to increase in intensity, buffeted us here until both anchors were dragging. In order to save the ship and the scow from going on the rocks, it was mandatory that an anchor watch be kept the clock around. Reanchoring was necessary time and again.

We played nip and tuck with the storm in Tee Harbor for four days—until early in the morning of November 26. At 6:30 on that day, two and a half hours before the late Alaskan daybreak, the wind partially subsided; and, taking this as a favorable omen, we hurriedly got under way. This lull, however, was apparently a part of the weather's strategy. Just as we reached the point from where it was too far to put back, the storm returned to full siege—and with a new weapon in the form of snow.

Cautiously threading our way through a net of reefs and islands, we were completely smothered by the snowstorm. Beacon lights were thoroughly obliterated. Thus blinded we were reduced to feeling our way with compass and chart. One unsounded or misplaced reef on the chart, one inaccuracy in plotting, or any slight deviation in the compass, and *finis* would have then and there been written for the expedition. Fortunately no errors occurred. And compared to what was still in store, the troubles and worries we ex-

Safely back in her dock in the small boat harbor in Juneau, with some of the ice-coating accumulated on her historic voyage still clinging to her

The ice-coated scow and special cargo on the beach in Madsen's Cove, just before we unloaded her during the dramatic "detail" in Alaska

perienced in these straits were like birdseed in a barrel of buckshot.

Bad as it was, the storm continued to get worse; until finally we were forced to alter our course, to leave Lynn Canal and head into Chilkat Inlet. At 3 p.m. we made Madsen's Cove, a point of relative safety from which a narrow highway led seven miles overland to our destination.

Just large enough for a boat to swing at anchor on forty fathoms without grounding, Madsen's Cove was cramped quarters. But with the wind out of the southwest the water was comparatively quiet. In two hours we had cast off and anchored the scow, taken in the hawser, dropped our own anchor and, in brief, were breathing easier than at any time since leaving Juneau.

But here again, our sense of security was without due respect or proper consideration of the weather. At about two in the morning we were wakened out of our first peaceful sleep in almost a week to find that the sou'wester had suddenly and inconceivably shifted to northwest. A little island at the mouth of the cove offers fair protection from storms in the southwest but there is practically no shelter from northwest winds at all. We were neatly trapped in the face of almost the full force of the gale.

While we were asleep the temperature had dropped to near zero and the deck was a glaze of wet ice. Any attempt to set foot on it would have been sheer suicide—not because of the ice, but because of the wind. Anyone attempting to stand against it now would have been irresistibly swept off into the sea.

Nevertheless, wind or no wind, ice or no ice, hemmed in as we were and with both anchors dragging, something had to be done. Five times in the matter of a few wild hours we managed to reanchor. When we went on deck to accomplish this, we crawled.

Reanchoring had enabled us to hold our own in Tee Harbor, but it became increasingly apparent that the same shift applied here was a hopeless and useless procedure. Our only chance was to head out into Chilkat Inlet and, at least until daybreak, try to ride the storm through. Leaving the scow with a prayer that its anchor would keep it off shore, we fought out of the cove.

Nine battering hours later, daylight found us still afloat in the open water; but now inched under with ice from top of mast to Plimsoll line. Crawling back into the cove under this extra load we opportunely arrived exactly at the moment the fates had arranged for us. We were just in time to witness the parting of the anchor line on the scow. Under the beating of the storm the three-quarter inch steel cable finally gave way. The scow, turned loose, raced the short distance to the beach, hit it with a thud, and stayed put under full wash of the waves.

Once we were back in the cove, however, our plight was no better than it had been when we were forced to pull out. If anything, iced-down as we were, it was worse. Our anchor simply could not be made to hold. If we were to save ourselves from following the scow it was necessary to get shore-lines out without delay.

The business of getting our iced-in, twelve-foot round-bottomed skiff free of the ways and overboard without smashing it against the side of the heaving ship, — embarking therein, and carrying the lines ashore, fell to me. I have only the vaguest recollections of how it was accomplished. But I do know that after eight gruesome hours of fighting wind, ice, cold and the wallowing sea the job was done. And once the shore-lines were fast we not only had reason to feel, but actually were, at last, secure.

Weather broadcasts from Eldred Rock Lighthouse, a few miles away, reported wind velocities of over seventy miles an hour. This was not surprising. We laid to for three more days with the wind seldom under sixty miles an hour and at times reaching hurricane force of over eighty miles an hour.

On November 30 the storm subsided enough for us to get a line on the scow; and considering all that had gone before we were surprised to get it off the beach at extreme high tide with practically no trouble. Though covered with ice from ten to twenty inches thick, our cargo, as luck would have it, was intact. In spite of the beating, no appreciable damage had been done.

Now thoroughly wary and unwilling to expose ourselves to further trickery or broadsides of the weather, we decided rather than attempt even the short tow to the wharf at Haines, to unload the trucks on the spot. It was possible to cover the remaining distance by road.

Maneuvering the scow into position was relatively easy. But unloading presented major difficulties. Before anything could be moved it had to be chopped free from a foundation of ice. This required a tedium of care, especially in the case of the trucks where a single slip of the ax meant slicing through a tire.

And once removal of the exterior ice pack had been completed we concentrated on the truck motors. Water had been driven under the hoods of these vehicles so the interior mechanisms were also ice-coated. In this exigency we had to resort to the use of blow torches.

On December 3, after three days of labor, as witness to the old proverb that nothing is impossible, the trucks, winch and all the rest of the gear were finally unloaded and ready to go. All that remained of our detail seemed simple — a mere matter of driving the trucks under their own power over the seven miles of road.

But the weather was still with us. By the time we were ready to shove off, a whipping blizzard blocked the road with two feet of snow. Under their own power the trucks could get nowhere. In the end it was necessary to radio to Haines, hire a Caterpillar tractor that happened to be there, get a driver to wrestle it to the cove (*Continuing on page* 427)

A SAGA OF SOUTHERN PINE

In Which Paper-Making and Forestry are Seeking a Common Meeting Ground

By C. F. EVANS

THE phenomenal development of paper-making in southern states during the past half decade is an industrial saga typically American. Widely publicized, it has stimulated critical interest in the forest resources of the South and in the extent to which an increased drain upon existing forests for pulpwood may affect both the forest economy and the human economy of a "piney woods" coastal region stretching from Texas to Maryland and embracing parts of ten states.

Without going into the many questions involved, it is timely to view objectively what this rapidly expanding industry is doing to conserve the forest resources and to assure a continuous growth of pulp-

PLOT I
SELECTIVE CUTTING
PROVIDES CONTINUOUS SUPPLY OF TIMBER AND PROVIDES MAXIMUM INCOME ON A CONTINUOS BASIS
USE SELECTIVE CUTTING WHENEVER POSSIBLE

Unique in the annals of the "piney woods" is the organized campaign of the southern pulp industry to instruct farmers and other small woodland owners in methods of timber culture that will assure continuous crops of pulpwood. One feature of this educational work is the establishment of demonstration plots showing good and bad cutting practices. The plot above illustrates selective cutting whereby the young and fast growing trees are left for future cutting

wood forests in the South. Here, in the long run, lies the answer to whether the much heralded development will prove to be a blessing or a curse to the future welfare of the South.

As background to the question, it should be said that contrary to the belief of many the manufacture of paper and pulp products is not, historically, a recent development in the South. A rag paper mill was in operation at Williamsburg, Virginia, in 1744, nearly two hundred years ago. Except for a few small groundwood, soda pulp and sulphite mills, however, the southern states had no pulpwood industry worthy of the name prior to 1909 when the sulphate process of making paper was introduced in the United States.

The adaptability of this process to the pulping of resinous southern pine led almost immediately to growth of the industry in the South. By 1914 six large sulphate mills were in operation. The number increased to sixteen by 1935 and by the beginning of the present year, a total of fifty pulp and paper plants were operating in southern states. Of these, three employ the sulphite, five the soda, six the semi-chemical, eleven the groundwood and thirty-one the sulphate processes.

Expansion since 1909 came in three successive waves, the last and greatest of which began in 1936 with the construction of a large sulphate mill at Savannah, Georgia. Followed by the establishment of over thirty additional plants within a period of five years, the movement naturally has attracted widespread industrial and public attention. The South has viewed it as a desirable economic development because of the increased employment and wages it would provide, increased capital it would draw southward, and new local industries incident to the manufacture of finished paper products it promises.

Nevertheless the mushroom growth of new wood-consuming plants gave rise to local apprehension as to the effect on the permanence of southern forest resources. During the past decade, agricultural and industrial leaders of the South have become increasingly conscious of the importance of their timber resources and the threat of forest depletion. Unfortunately most of the South's virgin timber has been cut and existing forests are largely immature second growth comprising millions of acres of seedlings, sap-

Here is a lesson in "seed tree cutting" — the leaving of sufficient seed-bearing trees to restock the area after the usable pulpwood has been removed. This method is recommended only if it is impracticable to cut selectively

In the foreground is illustrated how not to cut. Note that in the plot no trees have been left and that wasteful methods of cutting have been employed. For the land owner, clear cutting without replanting is pretty much a case of killing the goose that lays the golden egg

lings, poles and small size timber. While the government's forest survey showed a favorable picture prior to the war in respect to balance of growth over drain for the southern region, it likewise showed many local situations where forest industries are facing bleak futures because of depleted forests.

The new pulp mills had a decided preference for tidewater locations. This, it was felt, threatened to result in concentrated cuttings in many sections where the forests already are seriously depleted of growing stock. The public had little reason to expect that the pulp industry would do other than follow the liquidating policies of the older industries which cut the virgin timber and moved on. The threat appeared even more ominous in this case because of the suitability of young and small-sized trees for pulpwood conversion. To the layman the huge quantity of wood required to keep one of these modern pulp behemoths operating appeared startling. The largest southern mill today consumes nearly 2,000 cords daily — a consumption that during one year calls for a rick of wood four feet high and four feet wide extending from New York City to St. Louis.

No wonder many southern people felt concerned about their future supply of timber. Actually, however, the drain on the South's timber resources as represented by pulp mills now operating is relatively insignificant compared to the drain from other sources. In 1941, for example, the pulpwood drain amounted to only about seven per cent of the tot drain for fuel, lumber and all other forest products.

Leaders of the pulp industry likewise showed concern about future supplies of wood. Their plants and acquired forest lands represented enormous capital investments which they naturally wish to safeguard against future shortages of raw material. They also should be credited with an honest desire to make their businesses contribute to the permanent economic and social well-being of the region.

During the winter of 1936-37 representatives of the industry held numerous informal conferences with forestry leaders familiar with southern conditions and through the American Pulpwood Associa-

tion a regional conference was arranged and held at New Orleans in May, 1937. Attended by representatives of the industry, the U. S. Forest Service and southern state foresters, the conference pioneered in the formulation of forest practices to be followed by the mills in procuring wood from non-company lands.

It should be here explained that while existing pulp companies in the South own some four and one-half million acres of forest-growing lands, the bulk of their pulpwood is obtained from farmers and other small forest owners whose lands are within economic reach of a pulp mill. This wood is obtained through procurement men or contractors who buy from the farmers and deliver stipulated quotas of wood to the mills at contracted prices. Until recent years both contractor and farmer have been chiefly interested in getting as much pulpwood as possible from the land with the result that the system has been highly destructive to forest perpetuation. How to bring about improved practices that would treat non-company forests as a crop was therefore a key problem faced by the mills and one to which the New Orleans conference was directed.

Most of the foresters who attended the conference knew little or nothing about pulpwood procurement or the job of keeping a big pulp mill running. Most of the pulp mill representatives, on the other hand, did not know very much about growing timber. Moreover, the two groups did not know each other and there may have been a little mutual distrust. It soon developed, however, that the two groups had the same ultimate objectives and it did not prove difficult to find a common ground for agreement.

At this meeting, the industry committed itself to the principle of selective or partial cuttings and at later group meetings at four points in the South drew up specific cutting rules, intended to serve as a floor level or minimum standard of forest practice below which no one would go. These group rules were correlated at a regional meeting at Jacksonville in December, 1937. No changes have been made in them since that date.

The Jacksonville rules reasserted the desirability of partial cuttings to maintain and improve forest growing stock and pledged the industry to use every practicable means of securing their adoption. In a more specific way, definite cutting rules were established to serve as a minimum standard to be followed with some minor variations in the four regional areas. The rules in general provided that no trees under eight inches in diameter, twelve inches above the ground, would be cut except for stand improvement purposes and that in stands more than eight inches in diameter at the stump not less than four seed trees to the acre would be left after cutting. A seed tree was defined as a thrifty tree with a well-formed crown and not less than eight inches in diameter, breast-high. The rules provided that in the naval stores belt trees which had been "worked out" for rosin and turpentine would be utilized where practicable and that no round or one-faced longleaf and slash pine trees would be cut for pulpwood except in the case of defective trees or where thinnings were needed.

Progress during 1938 in the enforcement of these rules was very slow. Inspections made by the Forest Service showed spotty compliance even with the minimum rules. Naturally there was a great variation in the standard of cutting practice in different mill territories. Where the higher mill officials took an aggressive interest, results were very much more favorable than in other cases. It was evident, even in such cases, that there was a big job to do in educating contractors and wood cutters before satisfactory results could be obtained. Few landowners, particularly small owners, were enough interested in partial cuttings to be of assistance in promoting them. On the contrary, small owners generally were anxious to have contractors take every tree that would make a stick of pulpwood. Too often this is still true today.

Real and measurable progress in the adoption of better pulpwood cutting practices began in 1939 when the Southern Pulpwood Conservation Association was organized by some of the leading companies and a professional forester employed as manager. For one reason or another some of the companies failed to join and support the Association and even now its membership does not include all southern pulp companies. The Association set out to conduct an educational campaign within the procurement organization of the member mills and among the timberland owners in mill territories. This effort was well planned and effective. All the familiar devices, such as leaflets and other printed material, are used and in addition the Association sponsors field demonstrations financed by member mills. Some of these field demonstrations have been attended by more than 1500 people, including many landowners. Cutting plots showing good and bad forest practices feature the field demonstrations.

Some of the member mills of the Association and one non-member mill furnish forest tree seedlings to farmers and others to plant old fields abandoned for agricultural use or poorly stocked places in their woodlands where natural restocking is not satisfactory. Several million seedlings have been distributed free of charge for this purpose and interest in forest conservation has been thus further stimulated.

The Association manager also inspects cutting practices of the various member mills as time permits. The Forest Service since early in 1937 has kept one forester exclusively engaged in the inspection of pulpwood cutting practices in cooperation with the Association and the state foresters. He has tallied "cut and leave" trees on thousands of random sample plots and has taken hundreds of photographs showing good and bad cutting practices. The data obtained have been made (*Continuing on page* 428)

EDITORIALS

OUR SCORCHED EARTH PRACTICE

CENSORSHIP obscures the national forest fire picture as the West swings into the critical season of dry winds and fire-dealing lightning. That fires have been burning, perhaps are now burning, may be taken for granted. August is a notoriously dangerous fire month west of the Rocky Mountains. Just how severe are these conflagrations, what damage is following in their wake, and how efficiently our wartime fire-fighting organizations are performing is military information. It is to be fervently hoped, however, that Nature, by being miserly with her thunderbolts of lightning, is fighting on the side of the foresters.

For, amazing as it may seem, the public is not. At a time when every tree, every square foot of soil, every atom of energy must be conserved for the winning of the war, we have the sad spectacle of willful or careless people, in increasing numbers, setting fires in the forests. Despite appeals and warnings that have been flashed to every citizen, despite a wartime forest fire prevention campaign of great scope and magnitude, we face the shameful fact that on our national forests for the first six months of this year 4,589 forest fires, 465 more than for the same period in 1941, have been caused by the acts of man.

How many, if any, of these fires have been the work of sabotage is not known. The chances are the number is small. Evidence seems to point to the fact that the cigarette-flipper, the match-thrower, the campfire-leaver, the habitual woods-burner, along with the incendiarist, are still with us—war or no war. Instead of putting aside their unholy torch in this hour of peril, they apply it with greater vigor. Instead of fighting the Axis powers, they are aiding them. They are, whether they realize it or not, enemies of free people.

We cannot win this war by applying a scorched earth practice to our lands. We can win it only by costly fighting, by intelligent utilization of every resource, by sacrificing everything not essential to victory. And one of the first things to go must be the habit of thoughtlessness and carelessness. This habit, when applied to the home, is criminal enough. When carried to the earth, to the forest, source of vital wartime materials, it becomes treasonable.

REVITALIZING FOR VICTORY

IN this war, as in all wars, it is that unquenchable something called spirit, or morale, that will win the last battle. The raw courage of tank crews thundering into action is not enough. Victory calls for the unyielding will of every man and woman steadfastly to endure whatever is necessary to maintain those things which are fundamental to our way of life.

What builds and maintains morale? Not the beating of propaganda drums or sweet-scented oratory. Morale is born of realism, of knowledge and sound appraisal of those things which are our own—like the good, clean earth and honest emotions. Fresh air, sunshine, tree-shrouded mountains, fields of clover—these are the sources of energy and inspiration from which we may draw to keep alert and efficient on the production line, calm and confident in our homes. These are the springs of strength, the fountains of courage, the wells of faith.

Nowhere are these sources more bountiful than in the true wilderness. There the elixir of life flows fresh from the cup of Nature. Each wind is a strength-restoring tonic, each towering fir a spiritual wine. There one may quickly renew, revitalize and re-equip both mind and body for the battles yet to be fought, the victory yet to be won.

Since 1933 The American Forestry Association has made it possible for hundreds of men and women to reap the fruits of wilderness living. Through its Trail Riders of the Wilderness, nearly fifty organized expeditions have gone into the roadless, primitive back country of national forests and national parks. Even as this is written parties are refitting themselves for the important days ahead somewhere in the Colorado Rockies.

Not everyone, of course, can become a Trail Rider and vacation for two weeks under wilderness conditions. But there are springs of strength and wells of faith closer at hand—in state and county forests and parks, for example. The important thing is for Americans, as well as their government, to realize that they can serve their country best by keeping physically, mentally and spiritually fit.

Unfortunately, there are individuals who fail to understand this. They argue that man-hours on the job and a national habit of sacrifice are all that count at this crucial time. They look upon vacations as non-essential, travel as a peacetime luxury. Morale, they say, is a state of mind, something to be turned on by the propaganda machines. This may be partly true in the hour of victory, but that hour has not yet arrived. Until it does, something more fundamental, something closer to man himself, is needed.

Nor must thinning tires and gasoline rationing keep us away from field and forest, from stream and mountain. Let's walk, if need be, to these sources of strength, courage and faith. That is the spirit of our fighting men. And that must be the spirit of those of us at home.

LOST SANCTUARY

By MORA M. BROWN

EVERY person who loves the forest either knows or remembers some woodland sanctuary which he calls in his thought The Cathedral. Sometimes it is the open heart of a closely clustered group of evergreens—shady, cool, and off the traveled ways.

Ours was in Idaho between a pine-bowered hill and a sturdy mountain stream; near enough to the hill to receive its protection, near enough to the creek to be enfolded in the organ music of its waters. It was gothic in architecture. Its columns were the trunks of tall blue spruces; its roof, high overhead, the silhouette of neat spruce boughs against a distant sky. Its floor was soft and silent with a carpet of dry needles. Its entrance was reached through a winding corridor of willows. And where the willows ended at the trees was a vestibule of clean damp earth.

Those spruces, guarding this cloister, stood so close together that they seemed to be a wall which banished everything but sound. And so thickly interlaced were their high branches that even at midday the rays of sunlight seemed to tiptoe in to sit, small and quiet, among the needles. And when the day was cloudy, being in there was like hearing the last whisper of twilight before the night stole in.

Such was the retreat in which we sought our silences. For silence was there. The music of the water was but its accompaniment, the notes to which the silence was the song.

But we who knew it were not its only visitors. Man, it appeared, was not the only creature in need of sanctuary. Birds went there to carol softly. Chipmunks scurried in and out without a sound. Squirrels some-

Victoria Packard

times rested in the branches. But the visitor I never saw was the one that intrigued me most.

I knew that he was young, that he went out by the same door through which he entered—our door. But, even though his nose must have told him that this was a hiding place of man, he was not disturbed. Early one morning, as I approached the cathedral, I heard the unhurried snap of twigs not far away, and saw ahead of me the stir of willows; and yet no wind was there. That was all I saw except, in the damp earth of the vestibule, the hoof-prints of a fawn. He had left one when he entered. He had placed the other there when he went out. And there they stayed all summer, his woodland signature.

After that the place was more of a cloister than ever.

Our camp was in a wide side-canyon. The cathedral was upstream from the camp, and across the creek. To reach it we inched across a fallen log, and wound among the willows until we came upon it in the lower curve of a great S in the stream.

The water wheeled swiftly around the top curve of the S. Willows shaded the deep riffles underneath the bank. It was an ideal home for trout. On the opposite bank, on the upper promontory, grew a community of firs and pines in the open way loved by picnickers. But so near they came to the water's edge that they also made a blind for fishermen.

From camp one day we saw an old car loaded with fishermen and poles going up our valley. After they passed we could tell from the sound of the motor that they had turned from the road to try their luck in the deep riffles of the bend. Then we forgot about them.

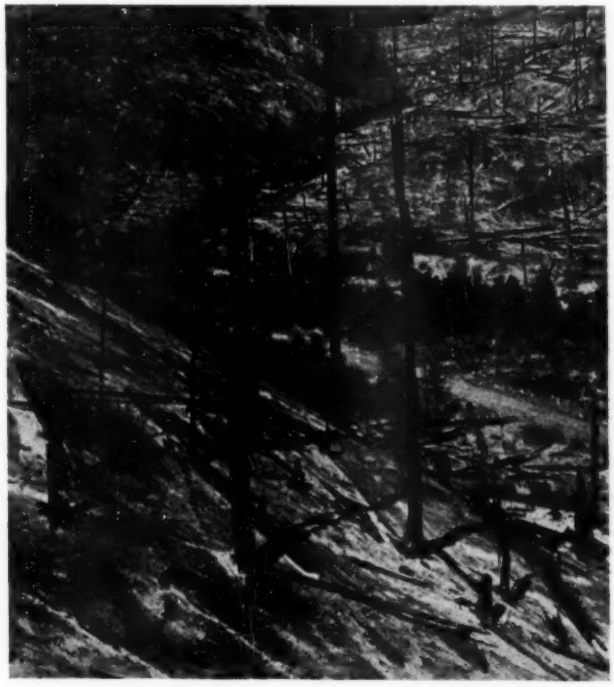
I was the only adult in camp that day. With me were four small children and two older girls. There was no car, a fact apparent from the road.

But suddenly there was smoke.

It raced through camp from upstream. It stretched itself out like endless lengths of grey chiffon among the trees. It stung our eyes, and made us choke. At first I thought it was the cathedral. Then I saw its tree spires rising ghost-like through the smoke.

We heard the excited sputter of a motor, coming with the smoke from the place where the car had stopped. We heard the motor roaring in first speed as if mad for greater speed. Then we realized that, somehow, carelessly, a fisherman had started the fire, and that the fire was spreading. They were racing now, we thought, to the highway after help. But when they reached the canyon road, I saw them turn, not toward the highway, but back into the hills.

I ran out into the open, and saw that already the blaze was beyond us, and spreading fast. There was nothing to do but run for aid. Out by the road where they were safe, I left the children with one of the girls. The other (*Continuing on page* 432)



SQUIRREL UP A TREE

By CHARLES ASKINS, JR.

SPORTSMEN trek to Alaska and distant India in quest of rare and oftimes dangerous game, but all I ask is an occasional morning beside my favorite creek, among towering cypress and spreading hickory, in pursuit of squirrels.

To me, squirrel hunting is the embodiment of everything sporting. A more exhilarating and satisfying sport does not exist. Take the sagacious gray squirrel, for instance. To outwit this woods dweller requires the patience of an Apache, the stalking skill of a Swahili, and the shooting ability of the old Kentucky riflemen.

Picture for a moment the sportsman's pleasure as he rises before the sun and trudges dim paths and shadowy bowers to a clump of cypress and tupelo gum hard by the swamp. There, his back against a timbered monarch, and with his favorite pipe going, he awaits the dawn. It comes with the first faint flush of a new sun, when the tightbark hickory turns from a drab shadow to the flaming yellow of early autumn. Then, as the sun's rays lengthen, there is a soft rustle above and the hunter's plumed quarry slyly emerges from a hollow maple. This is the moment. As motionless as a stone image, he thrills to the stealthy coming of the fox, or cat, squirrel. After a moment he maneuvers his gun to his shoulder; but this movement does not escape the animated little bundle of fur and it quickly scampers out of sight. Patient waiting and lynx-eyed watching may, after that, produce a sharp ear and a beady eye, for the squirrel is notoriously curious. However, the shot is apt to be difficult for bushytail will seldom show more than an eye and ear, trying work indeed for a rifleman.

In this country there are about ten species of tree squirrels, but only the fox, gray and red squirrels are commonly known. Of these, the most important are the gray and the fox. Gray squirrels are found from Canada down through New England and the eastern and southern states to Florida—and as far west as Texas and Minnesota. Fox squirrels range east of the Alleghenies, from Virginia to Florida and as far west as Louisiana. There are two kinds of fox squirrels, the northern fox and the southern fox, the last known as the cat squirrel.

One of the dearest fables of the Old South is the naming of the cat squirrel. It seems that Sherman, on his march to the sea had, among others, a huge chaplain, who while professing to be a man of the cloth was more raider than preacher. Coming to a great plantation with its inevitable "big house," the chaplain insolently invaded the kitchen and with a great show of authority summoned Aunt Julie, the negro cook, and bade her immediately prepare a squirrel pot pie. After a long wait the pot pie appeared and the godly one and his guests set to with great appetites.

The dish was eventually emptied and the parson found in the bottom what was unquestionably the head of a kitten. A grim silence fell, broken explosively by the chaplain who bellowed for Aunt Julie.

Hugh Spencer

Canny Gray Squirrel

"What do you mean serving us cats instead of squirrels?" he fairly frothed.

"Lan' sakes, pahson," said Aunt Julie meekly, "dem ain' no real cats, dem's halfbreeds, half squir'el an' half tomeat, jes' same as my boy. Emancipashum's half Yankee and half nigger—dat jes' make de meat look whitah."

Of the two, the gray and the fox, I cannot decide which is the easier to find and bring to bag. The gray squirrel, for instance, is a great forager, traveling far from its den. It is prone to raid cornfields, corn

cribs and berry patches, and is sure to leave its scent on the ground for the quartering squirrel dog. The fox, or cat, squirrel, on the other hand, remains in its treetop world secure from man and predator alike—or so it thinks.

While the gray frequently leaves its scent among the leaves, the fox is also oftimes guilty of serious breaches of squirrel strategy. For instance, corner one and it is apt to take refuge in a small hackberry no more than twenty feet high. The gray, on the other hand, will run like a frightened doe and, if necessary, take to the ground to get away. A good dog can generally catch a fox squirrel but seldom nabs the elusive gray. The cat squirrel more often than not in berry time will desert the high trees for the bushes, eagerly stuffing itself on wild grapes, service berries, red and black haws and wild cherries. In the fall its diet consists of hickory nuts, pecans, walnuts and beechnuts; and from the first ripening of the pin oak acorns in July until it hibernates late in the year, bushytail is busy in this and that grove.

A less common squirrel, but an endearing little cuss

When ranging the timber in search of game, the squirrel hunter needs cunning and patience

Bushytail seldom shows more than an eye and an ear—difficult work for a rifleman

nonetheless, is the "little cat squirrel" found in the swamp country of Arkansas, in Mississippi and in other sections of the South. The little cat is almost as dark as the big cat but has no red underneath. It thrives in numbers in various places, and it is not unusual to see half a hundred during a morning's tramp.

Squirrels for reasons best known to themselves migrate. I recall one such exodus years ago. The migration was a season-long affair, the squirrels moving through my timber in a more or less steady procession throughout the entire summer. I finally decided the little tree dwellers were changing homes because of a disease similar to mange. Countless individuals with patchy and ragged coats were observed. No dead were found, which indicated the disease was probably not fatal. Nevertheless, all of my squirrels were gone throughout that season and the following year.

Gray squirrels will invariably hunt out a hollow tree for a home, a refuge in time of danger, and for a nesting place. Fox squirrels also seek out a hollow for protection, but during the summer months they will build nests to escape the heat. Gray squirrels have likewise been known to do this. The fact that almost all large cypress trees have a hollow somewhere makes them (*Continuing on page* 427)

BLACK BIRCH

***Betula lenta*, Linnaeus**

BY. G. H. COLLINGWOOD

L. W. Brownell

In the open the trunk is short, and the branches long and spreading, but in the forest, black birch is tall and slender and clear of limbs for a great height

THE gracefully symmetrical round-topped black birch with its nearly black bark, slender branches, and dark green foliage is found on rich well-drained uplands from southern Maine through New York to eastern Ohio, southward to Delaware and in a narrowing area along the Appalachian Mountains to northern Georgia and Alabama. It is a common forest tree in the north but reaches its largest size in eastern Tennessee on the western slopes of the southern Appalachians.

Black birch belongs to the birch group of the family *Betulaceae*, which also includes the hornbeams, the alders, and the shrubby hazel. *Betula* is the Latin name for birch. The word is supposed to have come from the old Gallic name for these trees, the wood of which the Gauls carbonized to obtain birch tar. *Lenta* means tough, pliant, bending, and applies well to the slender whip-like branches which grow out almost at right angles to the trunk and droop at the ends. Black birch is also called sweet birch from the fragrant wintergreen flavor of the inner bark.

Black birch reaches a height of seventy or eighty feet with a trunk diameter of two to five feet. The bark on old trunks is one-half to three-quarters of an inch thick, dark reddish brown or almost black, furrowed, and broken into thick irregular plates. On young stems and branches it is smooth and shiny, marked with long horizontal narrow corky lenticels or pores. The twigs, pale green at first, change to dark reddish brown. As with all the trees in this family, no terminal buds are formed at the ends of the branches. The branches are prolonged by the uppermost slender sharp-pointed lateral buds. The leaves, growing alternately, often in pairs, on the sides of the twigs, are more or less oval with an uneven, rounded or heart-shaped base, a tapering tip, and numerous sharp, slender, incurved teeth on the margin. They are two and a half to six inches long and one and a half to three inches wide. The upper surface is dark dull green and the under surface is pale yellow-green with conspicuous hairy primary veins and yellow midrib. Supported by stout, hairy stems, approximately an inch long and deeply grooved on top, the leaves turn a clear, bright yellow in autumn.

The lower branches are horizontal and the upper ones steeply ascending to form a wide spreading crown in open-grown trees

L. W. Brownell

The staminate catkins, about three-fourths of an inch long, form in the late summer, and remain on the tree through the winter. In

April, before the leaves come out these catkins open to three or four inches in length and are bright yellow at first, and later, when the pollen develops, greenish yellow. The pistillate catkins are pale green and little more than half an inch long, maturing into erect small-scaled cones, one to one and a half inches long.

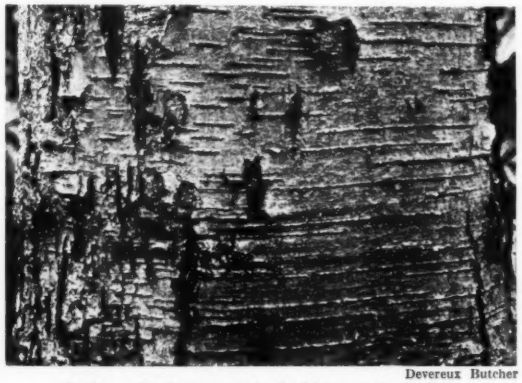
The wood of black birch is strong, hard, heavy, close-grained, has high shock-resisting ability, and a cubic foot when dry weighs forty-eight pounds. The dark reddish brown heartwood is enclosed in pale yellow sapwood that is several inches thick. Its principal uses include general millwork, boxes, crates, spools, bobbins, novelties, woodenware, fuel, motor vehicle parts, and, because it takes a fine polish, it is also used for furniture. In smaller quantities it is used for pulpwood.

Devereux Butcher

The leaves grow in alternate pairs along the sides of the twigs or singly near the tips, and the cone-like fruits grow from the base of the leaf stems

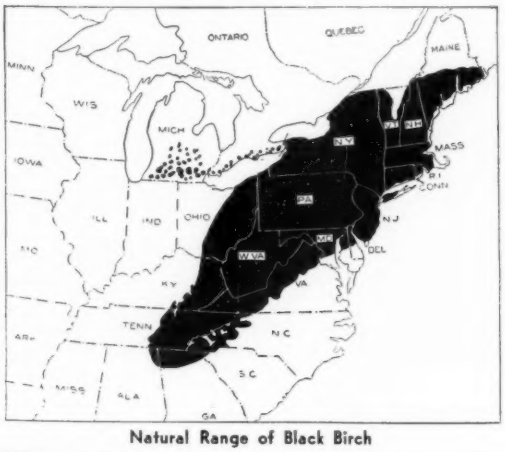
Black birch is one of the most important hardwoods for distillation in the production of wood alcohol. Distillation of the wood, bark and twigs also produces oil of birch, a substitute for oil of wintergreen used for flavoring, while birch beer is made from the sap.

The worst enemy of black birch is the bronze birch borer which tunnels between wood and bark and frequently kills trees by girdling. This pest is usually not prevalent in healthy stands of forest-grown black birch, but prefers old trees, trees on poor sites, and open-grown trees. Young trees are sometimes attacked by fungus.

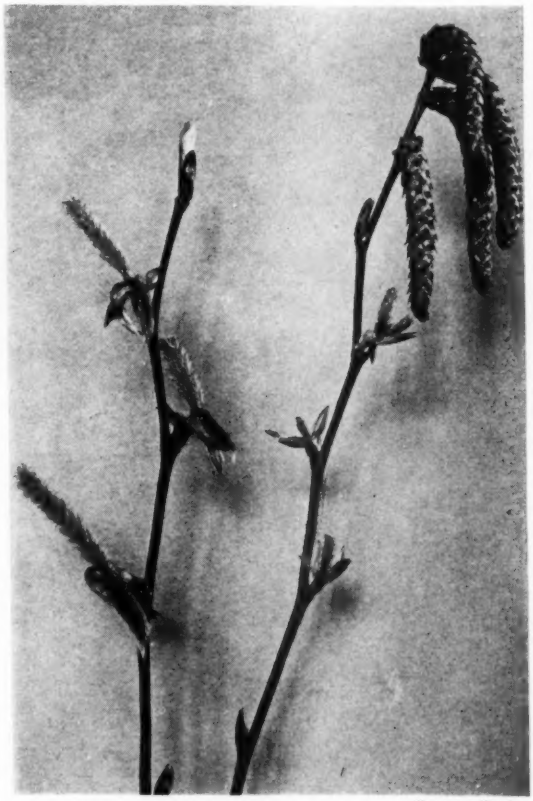


Devereux Butcher

Bark on the lower trunk of old trees is cracked into irregular scales, and on young trunks and limbs it is smooth, and has horizontal pores



Natural Range of Black Birch



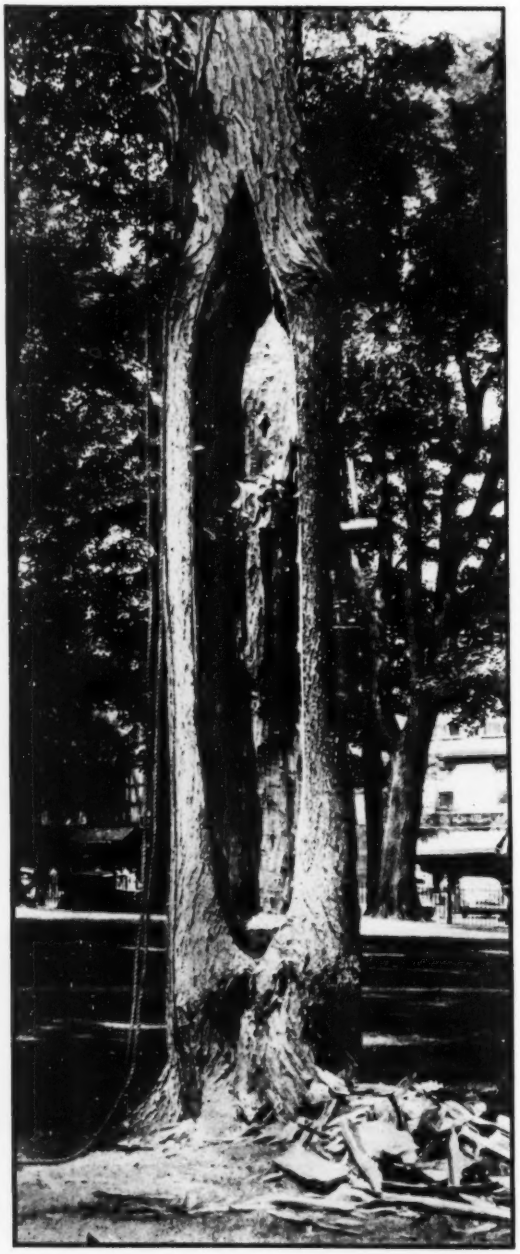
Devereux Butcher

Seed-producing catkins are pale green and grow erect from the sides of the twigs, while the pollen-bearing, staminate ones, shown at the right, are yellow and hang from the tips of twigs

YOUR SHADE TREES:

By P. P. PIRONE

CAVITY TREATMENTS



A large cavity, prepared and ready for the filling

FILLING cavities in the trunks and branches, perhaps the most spectacular of all tree maintenance practices, is to the layman also the most important. To be sure, this phase of tree care has a place in any balanced tree program, but it does not rank in usefulness with such practices as fertilizing, pruning, and spraying.

How Cavities Start

All cavities originate from neglected bark injuries, a subject covered in "Mechanical Injuries" in AMERICAN FORESTS in April, 1942. Sound bark forms an excellent protective barrier for the more susceptible tissues beneath it but, once an opening is made either mechanically or by some other natural agent, the sapwood soon dries out. When the tree is growing vigorously or the injury is not extensive, the open area becomes covered by a layer of healing tissue, or callus, within a year or two and little damage follows.

Where considerable injury occurs, or where a branch stub remains after faulty pruning or breaking by wind, healing proceeds slowly or not at all. In such cases, wood-rotting fungi and boring insects have ample time to enter and cause decay. The action of these organisms in turn prevents additional healing, and in time a large cavity forms.

The primary objectives of cavity work are to improve the appearance of the tree by removing decayed or insect-riddled wood and to eliminate breeding places for boring insects, ants, mosquitoes, termites, snails, and rodents.

Some persons have the impression that cavity work includes several other objectives—the principal one being to eradicate and cure heartwood decay. Cavity treatments will not cure decay and they rarely will even check further spread, —unless the area involved is very small.

As a rule, the fungus threads responsible for wood decay extend from a few inches to several feet beyond the rotted zone, into what appears to be sound wood. Although the gouging out of such wood is theoretically possible, it is neither economical nor practicable. Extensive laboratory work, which is beyond the means of most professional arborists and certainly of amateurs,—must be conducted to determine whether all fungus-infected wood has been removed. Moreover, the extensive removal of all wood containing fungus tissue would so weaken the tree that it would be a menace to life and property. Occasionally trees are killed outright when extensive removal of heartwood exposes the sapwood, which then dries out. Such trees might have lived for years if only badly decayed portions had been removed. It is well to trust the treatment of extensive cavities to a professional arborist acquainted not only with the type of tree but also with the various physiological and mechanical problems involved.

Treating Cavities

Though greatest emphasis in the past has been placed on filling cavities with some solid material, the tendency in recent years has been to leave the cavity open, once it has been cleaned out, treated with a disinfectant, and painted. This is especially true in the tree maintenance programs of large public enterprises, such as city and county park systems, where limited budgets do not permit extensive work on individual trees.

The principal steps in treating a cavity according to the standardized methods are cleaning, shaping, bracing, sterilizing and dressing.

Cleaning.—Remove all decayed and insect-riddled wood with a chisel or gouge.

Shaping.—Shape the interior of the cavity so that no water pockets remain. When the cavity penetrates downward in the trunk, cut away the outer shell to

eliminate the pocket. If the cavity is so shaped that deep water pockets cannot be avoided, bore a half-inch hole from the outer bark below the pocket into the lowest point of the depression and insert a short piece of drainpipe at the opening.

The treatment of the edge of the cavity unquestionably requires more care than any other phase of cavity shaping. Proper and vigorous healing will not take place unless the bark and cambium are healthy and sufficient sapwood is left under these tissues to prevent drying out. Cut the bark only with a clean sharp knife to ensure smooth clean edges, and apply shellac to the cut edges immediately to prevent drying out of these tender tissues.

Bracing.—Many large cavities require some type of support to keep the sides rigid or to hold some solid material securely, if a filling is to be used later.

The cavity almost completely filled, the cement having been laid in sections

Only an arborist with a good knowledge of the mechanics and physiology of the tree should be entrusted to install the supports.

Sterilizing and Dressing. — The final essential operations in cavity work include sterilizing and dressing. Sterilization is accomplished by painting all exposed parts of the wood with creosote, copper sulfate solution (one pound of copper sulfate crystals dissolved in four gallons of water), or bichloride of mercury solution (one ounce in seven and one-half gallons of water). After sterilization, a dressing of some ready-made tree paint should be applied, not only over the exposed wood, but also over the bark and sapwood which were previously shellacked.

The judgment of the arborist and the desires of the tree owner should determine whether a cavity treated in the manner prescribed is to be left open or is to be filled with some suitable material. If the cavity is left open, frequent inspections should be made to determine whether additional dressings are necessary or new rot has developed, in which case prompt attention should be given. The newly developing callus should also be inspected periodically and additional bark traced or cut back wherever healing is not progressing satisfactorily.

The preliminary procedure for filling a cavity should always include cleaning, shaping, sterilizing, and dressing as already described, with one modification: some provision must be made for drainage of sap and moisture which may collect behind the filling. Drainage grooves, resembling in form the veins of a leaf, are cut in the back and sides of the cavity; that is, a center groove corresponding to the midrib, with side grooves leading into it, as do the lateral veins. A hole is then bored from the outer bark up into a pocket just below the lower end of the main drainage groove, and a drain pipe inserted.

After being sterilized and painted, the entire inner face of the cavity is lined with three-ply roofing paper held in place with tacks. This paper will prevent clogging of the drainage grooves and will eliminate seepage of the liquids to the surface of the filling.

Filling Materials

Probably the cheapest and most readily available filling is cement mortar or concrete. Two parts of clean sharp sand are mixed dry with one part of cement, and sufficient water is added to produce a stiff mortar. The mixture is then placed in the cavity with a trowel and tamped firmly, especially near the walls of the cavity. If the filling is large it should be placed in layers or sections not over six inches wide, to prevent cracking from expansion and contraction and from twisting and bending when the tree is swayed by the wind. Three-ply roofing paper can be used to separate the layers. In wide cavities the sections should have vertical as well as horizontal layers with the roofing paper in between. The surface of the filling should never extend above the level of the cambium. As a guide to determine the proper level of the filling, the bark should be cut around the edge of the cavity, exposing a ledge of wood one-eighth to one-sixteenth of an inch wide. The surface of the filling should be level with that of the exposed wood.

An excellent example of cavity filling. The callus tissue is forming over the fill, which will — in a few years — be completely covered

Article of the Month

WOODS OF LATIN AMERICA

By SAMUEL J. RECORD

Each month AMERICAN FORESTS presents as a special feature an article which has appeared elsewhere and which, in the judgment of the editors, is of outstanding interest from the standpoint of the information it contains. WOODS OF LATIN AMERICA, by Samuel J. Record, dean of the Yale Forest School, has been selected for September because it answers many of the questions now being asked concerning the little known though supposedly fabulous timber wealth of Latin America. It also sheds revealing light on wood futures in the development of the Ecuadorian-Peruvian Oriente, presented on page 390 of this issue. Dean Record's article is reprinted from "Tropical Woods" for June.

MOST of Latin America lies within the tropics, but owing to differences in topography and climate there are all conditions from treeless wastes to dense rain forests. After deductions are made for deserts, open savannas, and cultivated fields, there remain enormous areas of potentially commercial forest. Taken as a whole, these forested regions are still in primeval condition, the great bulk of their timber unknown to the trade and apparently unwanted. Why?

There are really two separate problems, one concerned with local utilization, the other with the development of export trade. It is only in the larger centers of population that there is much demand for lumber, and at least a part of this is always supplied locally. In the vicinity of old towns and villages the forests are in poor condition as a result of overcutting. Supplies must come from constantly retreating sources with a corresponding increase in cost. If transportation facilities are poor, as they usually are in undeveloped regions, the timber chosen must be light in weight in order that the logs can be floated out or so the rived or hand-sawed boards can be carried or dragged over rough trails. To ease of transport and working must be added natural durability if the lumber is to be used in the tropics where termites and decay are a menace.

Coastal cities obtain a large proportion of their lumber from overseas, even if there are great virgin forests in the hinterlands. This is a matter of convenience and often also of cost. Lumber from the coniferous regions of the United States and Canada is dry, well manufactured, easy to work, and in many ways better suited for use in a modern city than the unseasoned, poorly manufactured product of small local mills. Large companies operating in the tropics, but owned or controlled in the United States, prefer coniferous lumber because its sizes and condition are standardized and its strength and other properties are known. To use native timber for anything but crude temporary work is usually considered of more trouble than it is worth.

V. Wolfgang von Hagen

Rafting mahogany logs down a jungle river of Latin America

The normal timber exports from Latin America to the United States and Europe consist almost entirely of cabinet and fancy woods. Making up the greatest volume is mahogany, which occurs in commercial amounts in the West Indies, southern Mexico, Central America, Colombia, Venezuela, and the upper Amazon regions of Peru, Bolivia, and Brazil. Closely related to mahogany is the Spanish cedar, a large tree of very wide distribution throughout most of Latin America. Probably no other timber has as many desirable properties to meet the native demand for lumber that is attractive in appearance, light and soft but comparatively strong, very readily worked, and noted for its natural resistance to decay and insect attack. Large amounts were formerly used in the northern hemisphere for the making of cigar boxes, but that demand is mostly a thing of the past. Overseas the wood had one specialized market and never found another of any importance.

The demand for other Latin-American specialty woods is subject to fluctuation. Dyewoods gave way to coal-tar derivatives, but assumed temporary importance during the first World War. The trade in lignum-vitae, the very dense wood

whose chief use is for the self-lubricating bushings of propeller shafts, is still a barometer of the ship-building industry, although plastic linings of stern tubes are coming into use. The furniture woods are at the mercy of the prevailing fashions. In a few fields there is a constant search for new woods to take the place of others whose supply is low,—as teak, French briar, boxwood, and dogwood. The rare and fancy woods are not very numerous and comprise only a small fraction of the tropical vegetation. They have little to do with the big problems of utilizing the immense quantity of mixed hardwoods such as characterize the evergreen rain forests.

The term hardwood is here used in the technical sense, meaning broadleaf or dicotyledonous species. Some of the timbers are extremely heavy and hard, others correspondingly light and soft, with all intermediates. There is an equally wide range in color, texture, and technical properties. One is impressed with the variety of species in mixture, although the number is greatest in the undergrowth and understories. Pure stands are rare, but certain species and genera may predominate over fairly large areas.

A mahogany stand is considered good if it contains an average of one merchantable tree per acre, but only a high-priced timber will repay the cost of such selective logging. The occurrence of any single kind of timber may be equally infrequent and the cost of extraction prohibitive. Mahogany and Spanish cedar logs will float and can be left in the forest for months without serious deterioration. Many other timbers are too heavy to float and lighter kinds may be quickly attacked by beetles or are subject to sapstain and decay.

The big problem in utilization is how to reduce selectivity in logging and remove, not one, but several to many kinds of timber at the same time. This is the dream of every owner and operator of a tropical forest property. Success or failure of a private enterprise will be determined by the law of supply and demand. Most tropical timber ventures have failed because the promoters were concerned primarily with the supply and took the demand for granted. This is a fatal mistake, since for the great bulk of the timber comprising the tropical forest there is no existing demand.

The reasons for this lack of demand for tropical lumber are not difficult to determine. Near the top of the list is the fact that tropical timbers are different from those growing in the north temperate zone. Being different is not the same as being inferior in technical properties, but it does imply unfamiliarity on the part of the consumer. All woods have their defects and peculiarities, but years of practical experience and long series of laboratory tests have demonstrated how most of the shortcomings of northern species can be overcome. Few private concerns are willing to take the trouble and incur the expense involved in trying out strange woods from overseas. Hence it is fallacious to assume because of a shortage of well-known timbers that unknown and untried kinds can be readily substituted for them. Trade practices and prejudices are involved and often prove too stubborn to be overcome except by a long process of education.

It must be kept in mind that the woods in question are of the general utility class and must compete in trade where the margin of profit is small. Until a special field is found for a new wood it must remain in a low-priced group. Low prices and high selling costs over a long period are likely to bankrupt any private concern before it gets well established. A prospective customer may be impressed with the possibilities of a wood for his business, but hold back because of the uncertainty of getting a continuous supply. When he realizes that the producer may fail, or lose his concession, or lack shipping facilities during times of war, he is likely to conclude that the new business is too risky. Why try to build up a trade without reasonable assurance that it can be maintained?

Such are some of the many problems involved in the utilization of Latin American forests. How can the situation be remedied? France, before the present war, afforded a good example of the proper procedure. Through cooperating organizations, every step from the forest to the factory was guided or controlled. Government laboratories made pilot tests on each wood to indicate its sphere of usefulness, after which it was given practical trial in industry. Every difficulty encountered was analyzed and, if possible, corrected. This might require the combined efforts of wood technologists, chemists, engineers, mechanics, and other technicians and experts, but the work was continued until the desired results were obtained. If the logs arrived in poor condition the trouble was traced to its source and the necessary steps taken to avoid it in future. Technical and popular articles were published to educate the trade with regard to manufacturing processes and to create a public demand for the use of woods from French colonies and mandated territories, and thus avoid imports from other countries.

No comparable organization exists with respect to Latin America. The Imperial Forestry Institute in England has made pilot tests on certain kinds of timber from the British Colonies in America, and similar tests on numerous Latin-American woods have been made in forestry schools and government laboratories in the United States. Considerable experimental work has also been done in some of the Latin-American countries, notably Brazil and Argentina. Greater progress has been made in identifying the different species comprising the forests and in correlating the data available concerning the woods.

These are important contributions to scientific knowledge, but they fall far short of solving the great and complex problem of properly utilizing the Latin-American hardwood forests. The task is too big for individual or private enterprise, but calls for cooperative effort on a large scale and sustained long enough to accomplish its purpose. Science and engineering together can find a way to use the tropical forest as a whole and make it a perpetual source, not only of plywood and lumber, but also of unlimited quantities of cellulose, a basic material with a myriad actual and potential applications in industry.

MAN-CAUSED FOREST FIRES INCREASE

Nature has cooperated better than man so far this year in the wartime campaign against forest fires. According to the U. S. Forest Service, a survey of national forests indicates that 465 more fires were caused by willful or careless acts of man during the first six months of 1942 than during the same period last year. Total number of man-caused fires was 4,589, compared with 4,124 in 1941. Lightning-caused fires, on the other hand, decreased —276 being reported in the first half of the year, against 748 in the same period last year.

The total number of fires in national forests from all causes at the half-year mark was 4,865, varying only slightly from the 1941 figure. These fires burned a total of 273,442 acres. The number of fires and extent of area burned on lands other than national forests were not available at the time of going to press.

REDISCOVERY OF WOOD

(*Continued from page* 397)

raised since the outbreak of the war from fifteen gallons a ton to as much as forty gallons a ton of waste. The pulpwood used by Europe's growing pulp industry supplies about 100,000,000 gallons of industrial alcohol, of the type distilled in this country largely from blackstrap cane molasses, as a yearly by-product.

Much of this alcohol is needed to make smokeless powder, nitroglycerine, and other explosives. Most is used to augment and improve the quality of military gasoline. But large quantities assist in breaking another transportation bottleneck, since alcohol is one of the chief components in the manufacture of artificial rubber.

Many military gas-driven vehicles and all of the domestic fuel-powered machines in Europe can no longer have any kind of gasoline at all. These are powered by wood directly. Over 500,000 automobiles and trucks, in addition to tractors and stationary engines from Norway to Italy, have been equipped with woodgas generators to take the place of ordinary fuel tanks. Such a generator is a simple cylindrical unit mounted usually on the side or the rear of the vehicle. It transforms charcoal or wood chips into the same mixture of carbon monoxide and dioxide which is produced by gasoline. Ordinary automobile plants operate reasonably well on this fuel. Recently it was officially announced that the woodgas generators used in Germany enable the Nazis to replace a million and a half tons of gasoline a year for military purposes, or as much as the entire German gasoline consumption during the whole Franco-Belgian-Netherlands spring campaign of 1940. France, Italy and Sweden have more than equalled Germany in the use of woodgas. Generators are mounted on farm equipment, boats and motorcycles. Diesel engines have proved particularly adaptable to this wood fuel.

This German omnibus is one of 500,000 vehicles from Norway to Italy now powered by woodgas

An outstanding European difficulty was the lack of lubricant greases and oils. Again wood has provided the solution. Tree-stumps are dug out and burned into kiln tars from which lubricants are manufactured. Sweden's Minister of Commerce reported in March that these "ersatz" lubricants obtained from tree-stumps will enable all of that country's motor traffic to keep going for the next two years. Soon after, Sweden decided to double its production of wood greases.

Two decades ago rayon was pioneered as a substitute for silk. Since then it has improved and developed into a fabric in its own right. World rayon production last year amounted to 550,000 tons, about twelve times the year's silk output. It is not always realized that ninety per cent of all rayon is made of wood cellulose.

But rayon is not the only fabric derived from wood. Its younger companion, staple fiber, is frequently called "artificial wool." Its production was only 4,000 tons in 1932. Last year it was 600,000 tons — even more than rayon. Last year Germany produced ten pounds of rayon and staple fiber together for every person in the Reich. Research is active in Germany for the development

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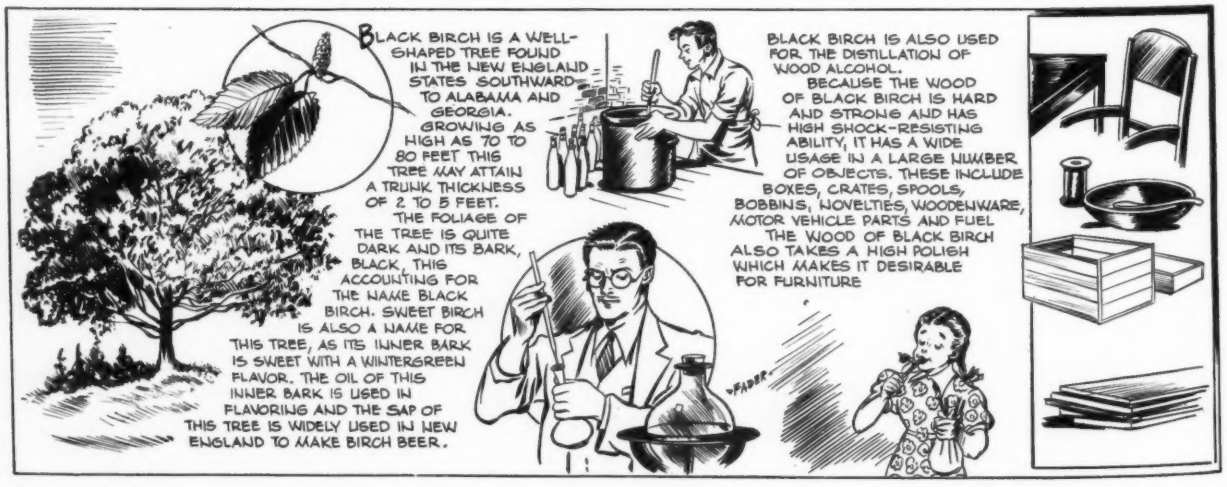
TREES AND THEIR USES—No. 68—BLACK BIRCH


BLACK BIRCH IS A WELL-SHAPED TREE FOUND IN THE NEW ENGLAND STATES SOUTHWARD TO ALABAMA AND GEORGIA. GROWING AS HIGH AS 70 TO 80 FEET THIS TREE MAY ATTAIN A TRUNK THICKNESS OF 2 TO 3 FEET. THE FOLIAGE OF THE TREE IS QUITE DARK AND ITS BARK, BLACK, THIS ACCOUNTING FOR THE NAME BLACK BIRCH. SWEET BIRCH IS ALSO A NAME FOR THIS TREE, AS ITS INNER BARK IS SWEET WITH A WINTERGREEN FLAVOR. THE OIL OF THIS INNER BARK IS USED IN FLAVORING AND THE SAP OF THIS TREE IS WIDELY USED IN NEW ENGLAND TO MAKE BIRCH BEER.
BLACK BIRCH IS ALSO USED FOR THE DISTILLATION OF WOOD ALCOHOL.
BECAUSE THE WOOD OF BLACK BIRCH IS HARD AND STRONG AND HAS HIGH SHOCK-RESISTING ABILITY, IT HAS A WIDE USAGE IN A LARGE NUMBER OF OBJECTS. THESE INCLUDE BOXES, CRATES, SPOOLS, BOBBINS, NOVELTIES, WOODENWARE, MOTOR VEHICLE PARTS AND FUEL.
THE WOOD OF BLACK BIRCH ALSO TAKES A HIGH POLISH WHICH MAKES IT DESIRABLE FOR FURNITURE
FADER

WHY INCENDIARY FIRES IN THE SOUTHERN APPALACHIANS?

By HILLIARD HENSON

INCENDIARY is an ugly word. But it wasn't ugly enough to keep western North Carolinians from deliberately burning in one month this Spring 55,000 acres of forest land, thereby destroying or damaging timber valued at nearly a half million dollars and charring some of the most scenic areas in the country.

Why do these people intentionally set the woods ablaze? During the months the fires were burning the idea of sabotage was splashed over the pages of local newspapers. But sabotage was definitely not the motive in this case. The fact is, to review the forest fire history of the region, there have been as many incendiary blazes in times of peace as there were in this recent month of war. Then what are the reasons?

This question has so concerned the Tennessee Valley Authority's forestry division that it recently dispatched one of its trained men to take up residence in a section where incendiarism is unusually rampant, there to discover if possible the motives that impel men to destroy their own wealth. The objective of making arrests is not involved. It is purely a long-range sociological and psychological study.

Some of the reasons for setting fires in the Southern Appalachians — and I am a native mountaineer myself — are peculiar to this locality. That inborn something called human nature is alike everywhere, of course, but in means of expression there are differences. For example, I have heard all my life that burning the woods in the spring destroys millions of insects that otherwise would descend upon garden and field. This idea received nourishment a few years ago when the arrival of the Mexican bean beetle made people more pest-conscious. And burning the woods is conducive to good health in the community, they say. Don't ask me why. The burners themselves can't answer that one.

Much forest land is burned in an effort to improve cattle grazing areas, many people forgetting that farm agents have told them grazing woodland doesn't help young trees; does little better for the cattle. And it's dangerous to allow too many leaves and things to collect near fences. Hadn't you heard that?

A tremendous acreage in the Southern Appalachians is in federal and state forests and game preserves, in tracts belonging to lumber companies and private fishing and hunting preserves. Herein lies another interesting thing about forest fires — from the standpoint of incendiarism, carelessness, and lack of responsibility in the control of blazes once they get out. I grew up on a farm situated only two miles from the 50,000-acre tract of one of western North Carolina's largest lumber companies, and I remember that few people seemed to worry about the mammoth blazes that swept across the property almost every year. In fact even officials of the company showed little concern. Among the natives it didn't seem to matter particularly just so the fire was on the land of the lumber firm. They would have plenty of timber left; besides, they had plenty of money already. That was the idea.

Some, of course, didn't feel that way, and there were those who had a genuine interest in forest conservation and the prevention of erosion. My father still lives on that farm and is particularly proud of the fact that he has a woodland tract that fire hasn't touched in forty years. Incidentally, about all the people in this particular community are now conscious of the effects of forest fires on erosion and flood conditions. In the floods that two years ago swept the mountain section, thirteen barns were carried away in their little valley.

Fires are set to create the job of fighting them. This spring I even heard of three men setting a number of blazes because they had the idea it would save them from the draft. My fellow mountaineers in a Virginia area set fires because they were convinced that too much shade kills the bush of the delicious blueberry.

A psychologist who made a special study for the Federal Forest Service came to the conclusion that people in isolated sections of the South set forest fires because they do not have enough things to entertain them. Maybe they like the excitement of trucks loaded with fire-fighters rushing by on their way to the blaze. Perhaps they like to hear the sawmill whistles giving the alarm. Or it may be that they just naturally like to see flames leap from the trees. As a weapon against incendiarism, the psychologist recommended programs of recreation for backwoods communities; even horse-shoe pitching if nothing else can be arranged.

Forest fire incendiarism almost invariably goes in waves. Credit this, along with the best foresters in the country, to one of the oldest quirks in human nature. You may not be hungry until you see someone else eating. You may not want to join the army until you see a neighbor marching away to war.

Woodland blazes can easily throw officers off the trail of a moonshine still, which, also, creates smoke while in operation. "Well, So-and-So must be making a run; the fires are out in the woods again." That was a familiar statement in the community of my childhood. More than likely it is heard today. But there is another side to this matter. A moonshiner has good reason for keeping fire out of the forest; it might burn up his own outfit. Still, striking a match in just the right place is an excellent way to get rid of the outfit of a competitor.

Then there is the grudge motive for setting fires. And it should be remembered that a man in an isolated community has more time to harbor a grudge than does one beset with the complexities of city life. City people nourishing a grudge "get even" by not inviting an offender to a bridge party, or by getting him kicked out of his job. With a fellow American at the head of some creek it's a much simpler matter. He just strikes a match where the leaves are dry.

God put game animals and birds here and He meant for everybody to share them alike. That's the belief of many of my rural neighbors. Sometimes it gets spiked with anger when closed forest areas are discussed. It is a conviction that came to these hills from the old England of great estates — lands on which hunting

(*Continuing on page* 430)

PROGRESS OF WARTIME FOREST FIRE PREVENTION CAMPAIGN

THE Wartime Forest Fire Prevention Campaign, launched on July 24, is in full swing. Planned by the National Advertising Council and being directed by the United States Forest Service in cooperation with public and private agencies, this major drive to aid the war effort by reducing the number of forest fires caused annually by human carelessness is being pushed vigorously throughout the country, with special emphasis in the West, where the fire season is now approaching its peak. This emphasis will swing east ahead of the autumn fire season along the Atlantic Coast.

With practically every medium known to modern advertising and promotion being employed in the campaign, R. F. Hammatt, campaign director, has announced that public cooperation is exceeding expectations. As an example, he pointed to a forest fire prevention exhibit, the first of a series designed to answer the question "What Can I Do to Help Win the War?" now being displayed in more than 1,600 stores of the J. C. Penney Company. This exhibit, planned to emphasize fire prevention as a wartime job, utilizes material prepared by the Talent Pool of the National Advertising Council for the campaign. The Association of Chain Food Stores is displaying thousands of campaign posters.

As of August 1, Mr. Hammatt said more than 400 radio stations were cooperating by broadcasting recordings of short fire prevention skits and spot announcements prepared at campaign headquarters. Well known radio commentators are also giving support. Paramount Pictures, Inc., is featuring forest fire prevention and the campaign's slogan "CARELESS MATCHES AID THE AXIS" in connection with announcements of its forthcoming production "The Forest Rangers."

Reprinted by courtesy of the San Francisco Call-Bulletin

Many large corporations, including the Mountain States Telephone and Telegraph Company and the Bell Telephone Company of New Jersey, are distributing fire prevention stuffers and other appeals to their employees and customers. In southern California a street railway company has printed a fire prevention message on 35,000 weekly passes.

Girl Scouts throughout the country are making and distributing fag-bags—small cloth bags in which smokers entering forest areas are encouraged to keep cigarettes and matches. On each bag is printed a reminder that is flashed to the attention of the smoker every time he reaches for a cigarette, that CARELESS MATCHES AID THE AXIS. The General Federation of Women's Clubs is distributing automobile ash tray stickers carrying fire prevention slogans.

Newspapers are cooperating by bringing the campaign slogan and other fire prevention messages to the attention of their readers. A cartoon by Thompson, which appeared in the San Francisco *Call-Bulletin*, is reproduced on this page. National advertisers are supporting the campaign (for example, see the Pacific Marine Supply Company's advertisement on the back cover of AMERICAN FORESTS for August).

According to Mr. Hammatt, more than 20,000,000 fire prevention stuffers, leaflets, cards, posters and displays have been prepared for the campaign and are now being distributed. Copies of this material are available at national or regional headquarters of the Forest Service, state foresters, extension foresters, and local service clubs.

ALL FOREST FIRES ARE ENEMY FIRES

Every fire in our fields and forests this year is an enemy fire. It makes no difference if a great forest blaze has been started by enemy action or by the carelessness of a loyal American. In the end, lives and property are destroyed, timber and soil resources needed for victory are lost. . . . The men who are fighting and preventing fires in our forests are giving great service to the nation, but they need the help of every patriotic American. They need the assurance that citizens will be careful with matches, with their smoking material, with fire in any form, when they go into the woods.—Secretary of Agriculture Claude R. Wickard in radio address over CBS on July 24, launching the Wartime Forest Fire Prevention Campaign.

Forest to Honor Louis John Taber

JUVENILE Grangers of the nation have established a forest in honor of Louis John Taber, for eighteen years Master of the National Grange. Mr. Taber retired in 1941, during the Diamond Jubilee of the Grange at Worcester, Massachusetts.

Officially dedicated this spring, the Taber Forest of 400 acres is located within the boundaries of the Wayne National Forest, about a hundred miles south of Mr. Taber's Columbus, Ohio, home. Juvenile Grangers, under the leadership of Mrs. Margaret H. Caldwell, their national superintendent, sponsored the planting of 400,000 "penny pines" on the 400 acres.

Louis John Taber

The planting was carried out in cooperation with the United States Forest Service.

In addition to the pines, purchased with pennies earned and saved by the Juvenile Grangers, white ash and black walnut seedlings are being planted on the Forest. Later, trails, campfire sites and picnic areas will be developed. An attractive rustic sign dedicating the Forest to Mr. Taber has already been erected.

Juvenile Grangers believe that tree planting is the perfect way to honor. Mr. Taber is known as a great farm leader, but forest conservation, particularly tree planting, has always received his active and enthusiastic support. — MARGARET MARCH-MOUNT.

Southern Pine Appoints Toler

Brooks Toler, state forester of Alabama since 1939, has been named forester for the Southern Pine Association, it was announced at the time of going to press. Mr. Toler was at one time extension forester of Mississippi and, before that, was associated with the Southern Forestry Educational Project of The American Forestry Association.

The Nation, in its urgent need, is calling for more than three billion feet of forest products monthly.

Fortunately, America's forest bank account is able to stand these war demands.

Thanks to inherited accumulations and modern forest management, we have great forest reserves for just *this* rainy day.

Today's forest harvest speeds tomorrow's victory . . . and replacements are growing for that sunny day ahead.

Timber ENGINEERING COMPANY

WASHINGTON, D. C. PORTLAND, OREGON

Please Mention AMERICAN FORESTS When Writing Advertisers

THE CONSERVATION WAR FRONT

THE Office of Civilian Defense is appealing to all citizens to volunteer their services to community defense councils.

"The official machinery, set up by law and executive order, for teamwork on the community front is the defense council," said Jonathan Daniels, assistant director, Office of Civilian Defense. "The character of these councils is the best measure not only of the security of people in their homes, but also is a measure of the strength which all American towns can add together to the national war effort.

"If defense councils are effective, more materials will be salvaged. If defense councils are vigorous, volunteer services will be equal to the increasing number of jobs which must be done. If the councils are strong, the men in the armed forces will be more solidly linked to the home front. In a word, if defense councils are the instruments they were designed to be and can be, communities everywhere will meet the demands of the emergency and release productive power with cumulative and overwhelming results.

"I am sure we can count on the members of The American Forestry Association to cooperate in meeting the needs of American communities in these critical days. I am sure we can count on them to volunteer their services to their community defense councils."

Wartime Fire Prevention Week

President Roosevelt, calling on all Americans to take active measures to conserve the nation's resources from the destructive toll of fire, has proclaimed the week beginning October 4 as Fire Prevention Week.

In his proclamation the President said: "Any loss of human life, any interference with production, any loss of critical materials hinders and impedes our war effort.

"Uncontrolled fire, even in normal times, is a national menace. It kills or disables thousands of our people and destroys a significant portion of our national wealth each year.

"Today, when every machine is being taxed to its fullest production capacity, when new hands are working with unfamiliar tools, and when agents of our enemies are seeking to hinder us by every possible means, it is essential that destructive fire be brought under control in order that victory may be achieved at the earliest date.

"Nothing less than the united vigilance and effort of all the people will suffice to break the grip of this menace. Fire hazards everywhere must be detected at once and eliminated. Loss of life and property from blaze and smoke must be reduced in every state of the Union. Prevention of all uncontrolled fires must be our goal."

Deferments for Lumber Employees

To clarify the problem of eligibility of lumber industry employees for occupational deferment under Selective Service, and to outline the steps which employers should take to protect against drafting of essential workers, the Lumber and Timber Products War Committee has issued a report, prepared in consultation with Selective Service officials.

Recently Selective Service published a new "List of Essential Activities" as a guide in the classification of registrants on an occupational basis. Virtually all activities in the lumber and timber products industry are entitled to deferment as essential workers; the case of each worker for whom an employer seeks deferment to be considered individually.

Copies of the report may be obtained from the Committee's offices, 1319 Eighteenth Street, Washington, D. C.

Fishery Coordination

Secretary of the Interior Harold L. Ickes, recently named fishery coordinator by President Roosevelt, has announced that immediate steps will be taken to carry out the program for development and maintenance of sustained production of aquatic food supplies essential to the conduct of the war. Dr. Ira N. Gabrielson, director of the Fish and Wildlife Service, has been named deputy coordinator.

As a preliminary step in the organization of the Office of Fishery Coordination, letters have been transmitted to all federal agencies affected by the President's order, requesting the designation of a liaison officer to participate in the program.

The new office is authorized to maintain close liaison with appropriate federal, interstate, and local agencies, and with fishery and allied industries, in the assembling of information relative to the conservation, production, processing, packing, transportation, marketing, and consumption of fish and other fishery products. Information relative to the construction, procurement, conversion, substitution, replacement and repair of fishery industry facilities also will be assembled.

Maintaining an overall supervision over the aquatic food supply, Fishery Coordinator Ickes is empowered by the President's order to make specific recommendations to federal and other governmental agencies and the affected industries to insure maximum coordination, and to deal with problems involving supply, allocation and procurement of equipment required by the fishery industry.

Civil Air Patrol Over Forests

Volunteer pilots and planes of the Civil Air Patrol are aiding forest protection agencies in the wartime fight against forest fires. Cooperation of the civilian flyers was arranged through an agreement with the Office of Civilian Defense, under which the CAP operates.

While the U. S. Forest Service is designated as the agency to work out arrangements with local wing commands and squadrons, the agreement also provides for cooperation with state forestry departments and other federal agencies concerned with forest protection.

At present, the CAP includes more than 50,000 men and 10,500 airplanes, and the roster, in addition to experienced pilots, includes many trained specialists such as mechanics and radio operators who can function effectively either in ground or flight activity.

Air services which CAP may be called upon to perform include: detection—observation in times of low visibility after electrical storms and over "blind spots"; scouting—observation and reconnaissance of going fires; transportation of men—and ferrying of overhead personnel and small fire-fighting crews; cargo transportation—delivery of supplies and equipment for fire-fighting crews, to be landed on air fields or dropped by parachutes; and general civilian aid in emergencies.

The Forest Service provides training for cooperating CAP personnel in the special types of work involved in forest protection, including training in detection, reporting and dispatching practices, forest communication methods, packaging, loading and dropping of cargo, and familiarity with terrain, local weather, and behavior of mountain air currents.

War Damage Insurance for Timber

According to the War Damage Corporation, standing timber may be covered by insurance against loss and damage from enemy action and counteraction by American forces. Insurance will be provided at the rate of fifteen cents a year for each $100 of coverage.

Although no official ruling has been announced as to the class of timber that may be insured, it is generally interpreted as all timber of current market value. Applications for insurance will be accepted by local agents of private insurance companies. No policy will be issued for a premium of less than three dollars.

PINCHOT AND GREELEY DEBATE REGULATION

FEDERAL regulation of forest resources was debated briefly in mid-July in an exchange of open letters between two former chief foresters of the United States, former Governor Gifford Pinchot and Colonel W. B. Greeley, now secretary-manager of the West Coast Lumbermen's Association.

In an open letter to the press, Governor Pinchot vigorously condemned present forest cutting practices as ruinous and urged immediate action by the federal government to regulate such practices.

"Instead of cutting our forests under forestry so that they can grow more wood," he said, "we are cutting almost all of them in a way to prevent them from growing more wood. We are cutting as if we were going to need no wood after the war is over. That is pure foolishness.

"We shall need more wood, vast quantities of it, after the war is won. Without it this country could not prosper.

"Three-quarters of our timber lands are in private hands. Every acre of these can be destroyed whenever the owner chooses. In this there is neither justice nor common sense."

Declaring that no forests in the world are safe against destruction unless they are under government control, Governor Pinchot pointed out that "Our federal government can require private owners to cut their timber lands so as to keep them growing wood, but our federal government lets the destruction go on. Our government has the knowledge of what needs to be done, and the foresters to see that it is well done."

Urging public support in Congress of a bill "which, without interfering in any way with winning the war, will safeguard our forests and our future wood supply," Governor Pinchot concluded:

"I am a forester. I give you my word that what I suggest is possible and practical. As a former state governor I know that the states cannot take action in time. Only the federal government can."

In reply, Colonel Greeley invited Governor Pinchot to visit the Pacific Northwest and see at first hand how many of his forest practice ideas have been put into force by the forest industries.

"No country," he stated, "should hesitate to draw upon its capital resources in time of war. We are drawing heavily upon our forests; but the fear of their widespread destruction is groundless. Our total cut of lumber last year was under 35,000,000,000 feet—less than we took from the forests every year during the decade ending in 1929. We will cut no more this year—a scant two per cent of our standing timber. Surely this modest use, no more than the cut in many peacetime years, is no occasion for driving through Congress a drastic extension of federal power over private business and property, under the plea of national emergency."

Pointing out that the forest supply of the United States is not as serious as pictured, Colonel Greeley said: "Timber growing — private as well as public — is gaining steadily. In the Pacific Northwest, 7,500,000 acres of junior forests, mostly in private ownership, are growing 500 to 1,000 board feet of new timber on every acre every year. More millions of recently cut acres are stocking up with young trees. Most of the logging follows a code of forest practice which insures reforestation if fire is kept out; and the acreage of regrowing land is gaining on the annual cuttings. A cooperative forest nursery, maintained by the industry, will soon distribute 5,000,000 young trees for planting every year. And some 2,000,000 acres of commercial tree farms are leading in improved fire prevention and timber culture. A large part of the industry accepts timber growing as part of its job.

"We cordially invite Governor Pinchot to come to the Northwest and see for himself what is doing in timber cropping and permanent forest industries."

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Downdraft patented woodburning home heater.

— Burn Wood —

Enjoy 24 hour continuous heat, save up to 50% and more on fuel. More heat due to Ashley's patented downdraft thermostatic system, according to many letters on file from Ashley users which we will gladly send upon request.

No fires to build daily, remove ashes on average of three times a month. Burns wood, small worthless type trees, clean, native plentiful fuel. WOOD. Refuel morning, then at night, enjoy 24 hour continuous heat.

8 types and prices, $34.95 up to $49.95. We pay express anywhere.

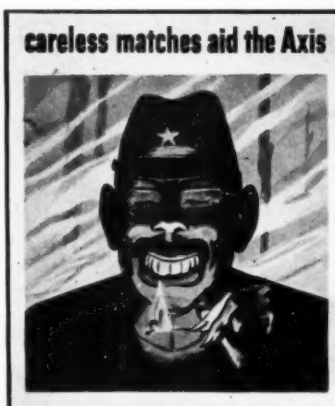
Over 2,000 retailed in one city and trading area. Our 12th year. Five patents, many thousands in use, time tested and proven.

Burn Wood, conserve other fuels which the Government must ration.

If no dealer near you, write. We will ship express prepaid anywhere.

Ashley Automatic Wood Stove Co.
Columbia, S. C.

PACIFIC PORTABLE PUMPERS FOR VICTORY



Protecting America's natural resources is doubly important during these busy war days.

PACIFIC PUMPERS now being produced by the Pacific Marine Supply Company are going direct to our Armed forces. We know Civilian Fire Protection Organizations will understand if their orders cannot be filled immediately.

As the leader in Portable Pumper equipment development, we gladly offer our facilities to owners and users of fire fighting equipment.

Just drop a card to:

PACIFIC MARINE SUPPLY CO.
FIRE FIGHTING EQUIPMENT DIVISION
SEATTLE, WASHINGTON

CANINES AND COYOTES, by Leon V. Almirall. The Caxton Printers, Ltd., Caldwell, Idaho. 150 pages, illustrated. Price $3.00.

This is the account of a sport, very little known and gradually dying out as civilization has encroached on the area of the Rockies and the great plains of the West. Coursing coyotes with "runnin' dogs" is hunting packed with thrills and excitement. Mr. Almirall, an experienced cow-man and rancher, is a sportsman as well and knows the coyote—predator *par excellence*—and his ways thoroughly—also the way of the stream-lined dogs trained to pursue him, view-hunters all — greyhound, Borzoi, deerhound and "cold blood." In this volume, the first to cover the subject comprehensively and with authority, the author makes real contribution to the historic literature of the hunt.

YOUTH IN THE CCC, by Kenneth Holland and Frank Ernest Hill. Published by American Council on Education, Washington, D. C., 1942. 265 pages. Price $2.25.

Of the many books and studies made of the Civilian Conservation Corps, this is the first serious attempt to give a complete and accurate picture of the Corps. The aim of the book is to make an appraisal of the Corps as a youth-serving agency. The book is more human and less academic in treatment than one might expect from professional educators or youth writers.

Mr. Holland was CCC Educational Adviser in Boston in 1933-4 and since then with the American Youth Commission. Mr. Hill has been an editor with the American Association for Adult Education. The chapter titles give the best idea of the book's coverage: Voices, Youth Corps for America, Background, In Operation, Many Are Chosen, Enrollee Goes to Camp, Commanders and Advisers, Men At Work, Guidance, Training in 1939, The Work-Centered Program, Workers for Defense, Body and Soul, Enrollees as Citizens, Youth Goes Home, A Greater Youth Corps.

The book is based largely on a five-year study of the CCC by the American Youth Commission including an experimental training program in ten Arkansas CCC camps. As part of this study tests were given to 9,000 enrollees all over the United States, and case studies made on 419 typical CCC youths.

The authors rightly state that there was no American precedent for the CCC; they settle the controversy of who originated the CCC idea by crediting Thomas Carlyle with his youth work and youth camps statements of 1840!

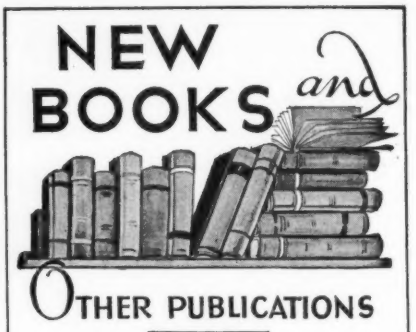
The authors take the position, so often assumed by professional educators, that education was not given sufficient time nor attention by the Corps, claiming that the educational program is or should be one of the chief activities of the Corps. This claim will be open to question because the original concept of the Act and of the President and the two Directors was that relief of unemployed youth and the doing of needed conservation work were to be the two main CCC objectives.

Perhaps the highlight of the book is the section "Creative Years," at the end of the volume. Here is an accurate and sympathetic appraisal of what the CCC was and what it did for America and three million enrollees. This section ends with a prophesy, especially significant now that Congress has seen fit to abolish the Corps:

"The CCC will live through its accomplishments and its energy. It has put an imprint upon service to youth and by youth which will not be easily effaced, and which future agencies for young American manhood must seek to match or excel. Its positive vitality dominates its imperfections and frustrations, and promises that, whatever may happen to names and regulations and administrative frameworks, the Corps will go on!"

ELEMENTARY FOREST MENSURATION, by M. R. K. Jerram. Published by Thomas Murby & Company, London, and Nordemann Publishing Company, New York. 124 pages. Price, $2.45.

Primarily intended for the instruction of British university and college students who intend to take up forestry as a profession. Deals with general history and theory of tree measurement, the increment of individual trees, the measurement of woods, and the measurement of forests. Contains volume and yield tables.



A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

The publications listed below must be ordered direct from the addresses as given and not through the Association.

Early American Soil Conservationists, by Angus McDonald. Soil Cons. Serv., U. S. D. A. Misc. Pub. 449. Supt. of Docs., Wash., D. C. Price 15 cents.

State Legislation on Planning, Zoning and Platting. National Resources Planning Board, Circ. XII (rev.), Wash., D. C.

Handbook for Farm Woodland Management. (A national guide for management of farm woodlands.) Soil Cons. Serv., U. S. Dept. Agr., Wash., D. C.

Pruning Southern Pines, by Wilbur R. Mattoon. For. Serv., U. S. Dept. Agr. Farmers' Bulletin No. 1892. Supt. of Docs., Wash., D. C. Price 10 cents.

Progress Report — 1940-1941. National Resources Planning Board. Supt. of Docs., Wash., D. C. Price 25 cents.

Illinois Forestry Laws and *Forest Trees of Illinois.* Published by the State Division of Forestry, Dept. of Conservation, Springfield, Ill.

Proceedings of First, Second, Third and Fourth Southern Shade Tree Conferences. H. S. Newins, Sec.-Treas., University of Florida, Gainesville, Fla. Price $2.00.

West Coast Log Values, by J. Elton Lodewick. For. Serv., U. S. Dept. Agr. Pacific Northwest Forest and Range Exp. Sta., Portland, Ore.

The Job of Forestry Research in the Central States. Compilation of papers by J. Alfred Hall, 90 West 10th Avenue, Columbus, Ohio.

Wildlife Management Through Soil Conservation on Farms in the Northeast, by Frank C. Edminster. Soil Cons. Serv. U. S. D. A., Farmers' Bull. 1868. Supt. of Docs., Wash., D. C. Price 10 cents.

The End of Unemployment, by George H. Maxwell, 602 N. 1st Ave., Phoenix, Ariz.

Ecology of the Coyote in the Yellowstone, by Adolph Murie. Nat. Park. Serv., Cons. Bull 4, U. S. Dept. of the Int. Supt. of Docs., Wash., D. C. Price 30 cents.

Colorado's Wealth. Department of Education, State of Colorado, Denver, Colo.

Restoring Conifers to Aspen Lands in the Lake States, by Hardy L. Shirley. For. Serv., U. S. D. A. Tech. Bull. No. 763. Supt. of Docs., Wash., D. C. Price 10 cents.

Slash Disposal and Forest Management After Clear Cutting in the Douglas Fir Region, by Thornton T. Munger and Donald N. Matthews. For. Serv., U. S. D. A. Circ. 586. Supt. of Docs., Wash., D. C. Price 10 cents.

Fuel Wood Used in the United States 1630-1930, by R. V. Reynolds. Forest Serv., U.S.D.A., Circ. 641. Supt. of Docs., Wash., D. C. Price 5 cents.

CONSERVATION IN CONGRESS

NO IMPORTANT conservation legislation has occupied Congress during the past month and none is in prospect for the immediate future in that the two Houses of Congress have agreed to take up no controversial legislation until about September 15. In the meantime the Congress is operating under a three day a week recess and only routine business is being considered.

Approval by the President of H.R. 6709, the Agricultural Department Appropriation bill, on July 22 makes available forestry and conservation funds for the Department as summarized in the August issue of AMERICAN FORESTS. Of particular interest is the distribution of the $4,000,000 appropriation for cooperative forest fire protection under the Clarke-McNary law. Of this amount, $2,500,000, as authorized under the law, will be distributed to States in accordance with the established formula. The additional $1,500,000 will be distributed to States one the basis of the extent to which the war emergency has increased the forest fire hazard, with particular emphasis on the protection of essential war industries which may be jeopardized by fire. The dual basis for distribution of these funds is considered necessary in view of the following directive of the Senate Subcommittee on Agricultural Appropriations in its report No. 1323 of May 13, 1942:

"The committee expects the Forest Service to supervise carefully the expenditure of the additional amounts appropriated for forest-fire protection and to avoid incurring unnecessary expenditures. This is considered an emergency appropriation and should not be used as a basis for building an organization which will require large appropriations to maintain after the emergency is over. The committee expects to consider carefully all expenditures made from these emergency appropriations at its next regular hearings on the Agricultural appropriations bill."

The entire $4,000,000 must be matched by funds from state and private sources. In addition, $1,500,000 was made available in the Agricultural Department Appropriation Act for emergency fire protection on national forests.

An effort to earmark $30,000 to purchase additional land adjacent to the Forest Products Laboratory at Madison, Wisconsin, for additional war research in forest products, was recently turned down by conferees considering H.R. 7319, the First Supplemental National Defense Appropriation bill.

CONSERVATION CALENDAR

Important Bills in Congress With Action July 16-August 3, 1942

BILLS ENACTED

H. R. 6709—Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1943. Final conference report agreed to by the House July 14, 1942 and by the Senate July 15, 1942. Signed by the President July 22, 1942. Public Law No. 674.

S. 2362 — O'MAHONEY — Relating to the jurisdiction over certain lands in the Isle Royale National Park. Passed Senate May 27, 1942. Passed House July 21, 1942. Signed by the President July 27, 1942. Public Law No. 679.

S. 2600—GILLETTE, et al—To expedite the prosecution of the war by making provision for an increased supply of rubber manufactured from alcohol produced from agricultural or forest products. Passed Senate July 22, 1942. Passed House July 24, 1942. Presented to the President for signature August 3, 1942.

FISH AND WILDLIFE

S. 1615 — CLARK, Missouri — To provide for the disposition of all moneys received from the sale or other disposition of surplus wildlife on refuges established under the Migratory Bird Conservation Act of February 18, 1929. Introduced June 10, 1941. Reported without amendment (No. 1569) by the Special Committee on Conservation of Wildlife Resources August 3, 1942.

NATIONAL MONUMENT

H. R. 7391—SHORT—To provide for the establishment of the George Washington Carver National Monument. Introduced July 15, 1942. Referred to the Committee on Public Lands.

NATIONAL PARK

H. R. 7449 — JACKSON — To amend the Olympic National Park Act. Introduced July 30, 1942. Referred to the Committee on Public Lands.

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NATIONAL FOREST RETURNS REACH NEW PEAK

BREAKING all former records, national forest receipts in the fiscal year ended June 30, 1942, totaled $7,113,554, the U. S. Forest Service has announced. This amount is $431,729 greater than last year's figure and $362,001 greater than the previous record in 1930.

The biggest gain was in returns from timber sales. This is largely attributed to the fact that cutting timber for war needs has been stepped up considerably since the first of the year. Timber sales totaled $4,953,100, an increase of $236,029 over last year.

Returns from grazing fees for cattle, horses, sheep and goats amounted to $1,595,126, a jump of $166,035 over last year's grazing receipts.

Returns from water power rentals amounted to $87,517; and special land use permit fees, such as rentals from summer home sites, resorts and other private or semi-private developments permitted on national forest lands, totaled $386,811.

JOHN H. HATTON, PIONEER FORESTER, DIES

JOHN H. HATTON, retired assistant chief of the Division of Wildlife Management, United States Forest Service, died suddenly at Indian River City, Florida, on July 29. He was seventy-one years old.

As a forestry assistant in Washington in the early 1900's, Mr. Hatton was a member of the famous "Baked Apple Club," a group of young foresters who met in the home of Gifford Pinchot, first chief of the Forest Service, and which later grew into the nation-wide professional organization, the Society of American Foresters. Until his retirement on July 1, 1941, Mr. Hatton had been associated with the Forest Service for forty years.

Mr. Hatton was born September 15, 1871, at St. Ansgar, Iowa, and graduated from South Dakota State College. Prior to his assignment to Washington, he had served in the regional offices of the Forest Service at San Francisco and Denver.

A pioneer conservationist, Mr. Hatton was known to foresters and stockmen throughout the country. He published many articles on range management, wildlife management and livestock grazing.

ORIENTE—NEW EMPIRE OF THE AMERICAS

(*Continued from page* 394)

dents. Of course alligators are occasionally seen on the river banks, and large turtles prized for their meat and eggs. Birds are plentiful, including wild turkey, woodcock, quail and other natives which contribute to the available food supply. Fish are a main source of food for the Indians and whole villages will go on fishing trips which, with curing, salting and feasting, last generally three days.

In the Oriente's Peruvian rivers, the Ucayali and Maranon, a large codfish called *bacalao* is speared or caught in nets. Often six feet or more in length, it weighs up to sixty pounds. Dried and salted, and known as *paiche*, it is used throughout the mountains. Large slabs of it, almost bone-free, are carried through the country in bundles to be traded for other food supplies.

There are snakes in the mountains, but no more plentiful than in our southern states. Indians, although they are always barefooted, seldom are struck by poisonous snakes. Permanganite of potash rubbed into the wound together with *curarina*, an internal snake remedy, generally will put the victim out of danger in a day or two. Occasionally, the large boa constrictor and the anaconda are seen, but these appear more fearsome than they really are. Our own copperheads and coral snakes are far more dangerous.

This, briefly, is the Oriente, the newest empire of the Americas. It is now ready for the explorers, for the developers. Modern engineering will no doubt make its way into jungles and forests, along the winding streams. Settlements will grow into towns—towns served by electricity and water, houses that will be air-cooled. All of the advanced knowledge of chemistry, agriculture and manufacturing will be employed. Highways will develop; railways will follow. There will be the airplane, streamlined river transportation, the radio and telephone. The Oriente will in all likelihood become what it is today believed to be—one of the rich, vast storehouses of the Western Hemisphere.

It is to be fervently hoped, however, that its developers will turn back the pages of history and read the tragic stories of other rich empires whose exploitation was carried out under the impetus of quick wealth without careful resource planning. The Oriente may be a fabulously rich treasureland today—but only a pattern of sound resource conservation in its development will save it from becoming a barren, fruitless land tomorrow.

DETAIL IN ALASKA

(*Continued from page* 402)

through the blizzard, hitch the trucks in tandem and pull them through. And once the trucks were delivered we again had to fight our way via the tractor back to the boat. The seven easy miles originally envisioned stretched to a nightmarish twenty-eight. And during it all the blizzard never once let up.

Finally, our mission accomplished, and with frozen fingers and facial frost-bites thawed out, the storm let up enough for us to weigh anchor for home. By contrast with the days it had taken us to cover the same distance on the outbound voyage, we arrived back at our dock in Juneau that same afternoon—on December 12. What had been scheduled as a four-day undertaking had required three weeks to the day.

With a less sturdy craft than the *Forester*, and with anyone less experienced than Captain Aikens at her helm, I am positive we would never have returned at all. Rare witness to the terrific force and extent of the storm, the captain himself rates it the worst in his many seagoing years.

SQUIRREL UP A TREE

(*Continued from page* 411)

a favorite homing ground. Both species of squirrels deliver their young in the den tree, but I have seen many reds of the plains country—Oklahoma and Texas—raise their little ones in a nest. Grays when harried by man or dog will make for the den if they can. Cats do this, too, but I have seen them take refuge in the topmost branches of a huge cypress or cleverly stow away in a bit of moss, a gnarled blister, or the forks of an overhanging limb.

Despite the fact that it is the usual thing to find several squirrels in the same locality, if not in the same tree, they are not overly gregarious. They enjoy plenty of room, like to live to themselves except during nesting season, and are bad tempered little scrappers. Very often when a squirrel is observed chasing another, it is not in play. A running battle is ensuing. The odd part of it is that as soon as the pursuing bushytail has nipped the fleeing cat he will turn and scamper off, the object of his wrath in hot pursuit. The battle may continue for many minutes, covering half an acre of forest. Finally both fighters seemingly quit by mutual consent, neither injured in the slightest.

Several squirrels romp in my grove about the house as I write. They make the grandest pets imaginable—intelligent, responsive, and fun-provoking. I should feel bad if anything happened to a single one of them. Quick to sense protection and to respond to it, these cat squirrels are continually chattering, scolding and berating me for a penurious attitude regarding my corn which to them should be common property.

Squirrels are where you find them. I have more than once gone into what I knew to be good squirrel timber only to return empty handed—not a cat to be found. In the early season a dozen or so may likely be found in the pin oaks. Acorns from these trees are a choice delicacy on the squirrel bill-of-fare. They also enjoy acorns from post oaks, overcups and white oaks. A bit later they will be busily engaged in shelling the big pecans, and still later they relish the resinous balls of the cypress and the large black berries of the tupelo gum. When the nuts ripen, the hickory, beech and late acorns, it is then better strategy to hunt back in the hills.

Squirrel hunting is more successful at daybreak or just after a light shower. Knowing a likely den tree or a number of them, the hunter moves into the woods long before sunup and carefully screens himself from the little tree dwellers. With the coming of the sun, if he has selected his country well, a squirrel will appear from the bowels of a great cypress. Without exposing himself, the hunter then brings his rifle into play. He may or may not bag his game. Regardless of his luck he should keep hidden and soon another will appear. If, however, he exposes himself, he might as well move on. I have bagged as many as five squirrels from a single tree, but always by remaining well concealed and

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by being extra particular about my marksmanship.

If the target happens to be a cat squirrel, and the hunter misses, it is a waste of time waiting for it to emerge again from the den. It will stow away for the remainder of the morning. If of a different breed, however, curiosity may soon get the better of it and the hunter will get another shot.

When the morning stand has finally played out, the hunter should range the timber in search of game, moving with all the quiet stealth of a raiding Comanche. He should travel from tree to tree, from brush clump to thicket, pausing every thirty feet to look and listen. His clothes should not touch a leaf, a limb, or an overhanging vine. He should not step on a stick, or rustle the mould underfoot. He should play a game with himself in which he determines to drift through the woods as silently as a wraith. He should look ahead carefully, searching for the slightest movement that spells game.

To me, hunting cat squirrels is the very essence of all that is sporting. A trial of skill between the stalker and his game, where all the cunning of man-learned wooderaft is pitted against the sharper instincts of the wild thing.

A SAGA OF SOUTHERN PINE

(*Continued from page* 406)

available to the Association and to the member mills and undoubtedly have served as a stimulus to better cutting practices. A brief summary of the results of this sampling during the past three years may be of interest.

Per Cent of Pine Volume, 6" d.b.h. and Larger, Left After Cutting

	1939		1940		1941	
Non Ass'n	No. locations	Per cent	No. locations	Per cent	No. locations	Per cent
mills	23	27.8	32	21.4	40	25.4
Ass'n mills	122	31.1	152	35.7	132	37.5
Total	145	30.6	184	33.2	172	34.7

Note: From one to five random sample plots were tallied on each location.

The per cent of volume left after cutting, it will be noted, has increased steadily during the three year period. The Association can feel gratified that its member mills are securing the leaving of a materially greater value of growing stock than non-member mills. It should be understood, of course, that these data refer to cutting on non-company lands. Forestry practices on pulpwood company lands are in line with the best forest management to be found in the region and no one is worried about the future of these timberlands. The Association does not concern itself with the management of pulp company lands of which there are over four and one-half million acres.

No one will claim that the southern pulp industry has yet accomplished what it set out to do in 1937. Progress in some respects has been disappointing. There are still a few mills that have made practically no advance and continue to tolerate cutting without regard to the future productivity of the stands. These are exceptional, however. The more progressive mills have steadily moved ahead. They have spent a great deal of their own money promoting good forest practices on land belonging to someone else. They are not complacent over the results so far obtained and they seem determined to carry on even during the difficult times that lie ahead.

It can be said, however, that real and permanent progress has been made by the pulp industry. Had a forest program of this type been undertaken fifteen or twenty years ago by all southern forest industries with the cooperation of public agencies, the South now would be well on the way towards the establishment of a permanent forest economy in every community.

REDISCOVERY OF WOOD

(*Continued from page* 418)

of other artificial wood-based fibers which can be used, for example, to replace jute burlap and Manila rope.

What Germany has done and is doing the United Nations are doing also. Woodgas generators are already in use in Great Britain, Australia, South Africa, and even in Canada. Deep in the Ural region Russian factories are said to be extending every new wood use now employed by the Germans. America is furthering wood chemistry.

Not the lack of the traditional raw materials so much as transportation shortages and the tremendous pressures of time are forcing the anti-Axis nations to re-examine wood even more closely than did Germany.

Outstanding in American development are transmuted construction materials, particularly fiber boards, water-and-weatherproof plywoods, malleable woods, impregnated and compressed plywoods, and wood plastics.

Water-and-weatherproof plywood was invented and proved just in time for this war. Plywood airplanes are far past the laboratory stage. At least fifteen American manufacturers are making them. Both the Army and Navy have plywood trainers. Development of these plywoods is not American alone. The Italians have four types of plywood bombers in action. One of the Russians' best fighters has plywood tail and wings. Resin-bonded plywood will not splinter in a crash or "flower" when hit by bullets. It is not subject to the fatigue which plagues metal near welds, because plywood does not have to be welded.

But American development of the new plywoods seems far to have outstripped that in other countries. The new plywoods are bonded by synthetic resins, mainly of two types: phenol-formaldehyde and urea-formaldehyde. When used as a bond these glues form a chemical union with the wood they join so that the "glue line," so-called, is actually stronger than the natural wood itself. When the wood is entirely impregnated with one or the other of these glues, and the laminated plies are joined together under tremendous pressure, "compregnated" plywood is the result.

The "plastic" airplanes beloved of the headline writers are not in fact made of plastics. They are made of resin-bonded plywood. These plywoods can be "cooked" under steam pressure, around a form, to any shape desired. The process finished, the plywood is left rigid as steel. It is stronger than steel of the same weight. It resists oil and water better than does metal. It is more flameproof than dural. Plywood airplane "skins" do not have to be riveted, and they do not "ripple," like duraluminum, at high speed. Both circumstances reduce air resistance.

For all these reasons mass production of "flying boxcars," both motored and gliders, to relieve shipping shortage in this war, is inevitable. Whether Great Britain and America will use plywood combat planes is a military secret. But plywood transport planes for our Army, to carry both supplies and men, are in production.

The urea used in one of the synthetic-resin plywood glues is an ammonia salt. Its base has been some animal protein. Now it can be derived from wood proteins. Phenol is being made from wood tar. Formaldehyde, the other constituent of the synthetic-resin glues, is likewise obtained as a by-product of wood distillation. Thus in America soon all of our weatherproof plywoods will be self-contained wood products, made wholly of the tree. But their only obvious relation to wood in its natural state will be that the surfaces will retain the characteristic and beautiful wood grain.

The qualities of this new wood material which have recommended it to airplane designers are equally useful elsewhere. Everything from boats and bathtubs to kitchen equipment and weatherproof building exteriors are being made of this "intensified" wood.

Quite different from the new plywoods are the new wood plastics made from sawdust. Hardwood sawdust is generally preferred, because of its low content of natural resins. For many purposes either plywood or wood plastics may be used. But the plastics, like wood sugar, are the products of wood hydrolysis.

Add three pounds of sulphuric acid to 100 pounds of sawdust, cook half an hour under a pressure of 135 pounds to the square inch, drain off the liquor and wash the residue clean in water, and when it is dry you will have sixty-two pounds of acid-hydrolized sawdust.

Grind that up and force it through a sieve, add 4.96 pounds of aniline, an equal amount of furfural, .31 of a pound of zinc stearate and 1.24 pounds of water, put it under from three to four thousand pounds of pressure at 150 Centigrade degrees of temperature, bring the temperature down ten degrees in three minutes, and you will have seventy-three pounds of wood lignin plastic manufactured by the acid-hydrolysis method.

If aniline is used instead of sulphuric acid to free the wood's lignin from the cellulose, the wood plastic will be made by the aniline-hydrolysis method. The product is even harder and stronger than the acid-hydrolysis plastic. Both are used for automobile and builders' hardware, telephone cases and radio cabinets, ash-trays, toilet articles, dishes, electrical appliances, and the like. Newer uses are for gears, washers, locks, and many other items of hardware for which metal used to be actually required.

The furfural used in the manufacture of these plastics is also derived from wood distillation. Wood chemistry may be the new frontier of wood-waste uses, to be explored until every part of every harvested tree finds its industrial use. Charcoal, wood tar, and wood alcohol

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SANDVIK BOW SAWS lead in quality and performance, are always dependable and materially assist in reducing operating costs. FRAMES of Seamless Steel Tubing, SAWS made from finest Sandvik Steel, thin back, fast and easy cutting.
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Selected Reading References on Conservation

A COMPREHENSIVE list of reading references forms an appendix to the book — AMERICAN CONSERVATION — In Picture and In Story.

This list has been reprinted as a separate of twelve pages, to meet the many calls for reference material. Copies may be obtained for 10c in coin or stamps.

THE
AMERICAN FORESTRY ASSOCIATION
919 Seventeenth Street, N. W.
Washington, D. C.

once were the only commercially useful products of hardwood distillation. Now acetate of lime, wood gas, methyl hydrate, columnian spirits, acetic acid, methyl acetate, formaldehyde, sodium acetate, acetic anhydride, methylated spirits, acetone and acetone oils, creosote, pyroligenous acid, are a mere beginning of the list of derivatives of wood-waste processing.

From the waste liquors of a woodpulp mill using the sulphate process already comes pine oil, rosin soap, turpentine, acetic acid, acetone, methyl alcohol, oxalic acid, and dimethyl sulfide in commercial quantities, with industrial exploration scarcely more than begun.

From the waste liquors of a sulphite process pulp mill already comes ethyl alcohol, sulphite turpentine, tannin, dyes, fertilizers, mordants, bakers yeast, adhesives, road surfacing material, fatty acids for the soap makers, vanillan, and paint and varnish removers.

American engineers have perfected a far faster and cheaper technique for making sugar from sawdust than any in use in Europe. The "continuous wood hydrolysis method" developed by Othmer and Katzen at Brooklyn Polytechnic Institute requires only a simple system of iron pipes, and achieves in from eight to fifteen minutes results for which German processes still require hours and heavy copper equipment. Ordinary sawdust can be shoveled into one side of the American machine and in less than a quarter of an hour raw sugar pours out, ready to be refined for table use or converted into alcohol for industry or for synthetic rubber, protein yeast, or glycerine for solvents or explosives.

Under old methods of forestry a third of the tree was left in the woods because there was no economic use for stumps and trimmings. Wood burned in fireplaces lost most of its heat up the chimney. The sun is setting on that day. The day has dawned in which sawdust and shavings which do not go to the chemical vats will serve as fuel in scientifically designed furnaces which burn woodgas extracted in units fed by hoppers which the householder need fill no more often than once a day. Shoes with wood fiber soles and weatherproof pulpwood tops will prove lighter and more durable than shoes made of leather. Wood will provide clothing, food, and the materials for recreation. Modified-wood building materials will defy the elements and the ages. And no builder will be limited by the natural strength or dimensions of a beam or board.

When this war is done the world will need, as it has never needed before, things to use. There will be shortages of everything. In all the world only America will have an unimpaired industrial plant. Not only wood, but every material which can serve to fill the world-wide need for food, clothing, shelter, and tools will be demanded. And fast economical transportation will be required for the finished goods.

WHY INCENDIARY FIRES?

(*Continued from page* 419)

privileges were denied to all but the noble and the wealthy.

I am myself descended from a man who was once employed by an English king and lost favor with His Majesty because he killed a deer on one of the royal estates. The youth was saved only when his mother smuggled him onto a ship sailing for the New World.

This feeling of resentment is strongest toward the owners of large private hunting preserves — "rich men from the city" who keep rural residents from hunting and fishing on land over which they tramped without molestation for years, in some cases land once owned by their own families. It is easy for these natives to become careless with matches.

Another thing about closed areas and incendiarism. Fires often drive bear, deer and other game into localities where hunters can easily get at them.

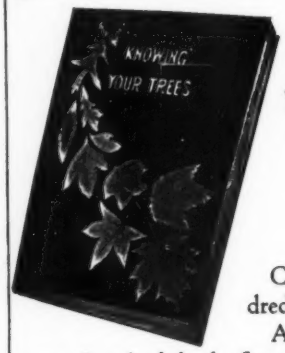
Grudges against lumber companies are often reasons for setting blazes. Sometimes men are refused jobs. Then, too, some of the companies have begun charging for cattle ranging, for generations a free privilege.

There is always the man who has a quarrel with his neighbor and doesn't cool off until he has slipped over into the next hollow and "let him have it."

Many Southern Appalachian folk don't yet realize that a woodland blaze now is a lot more serious than back in the days when their ancestors were carving homes out of a wilderness. A tree might have been a nuisance then; now it is a blessing. Clearing land is a thing of the past in these parts; many even wish that they had some of their fields back in forests again.

Perhaps some day they'll all learn the value of trees. But until that day comes forest fires will be intentionally set, and there are plenty of reasons why. Maybe one way to speed its arrival is to add to the personnel of forest control units more natives of the Southern Appalachian region, men who know the life and background of these people who set fires. It would help defeat incendiarism.

THE AMERICAN FORESTRY ASSOCIATION PUBLISHES AND RECOMMENDS . . .



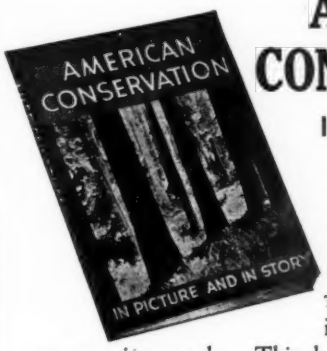
KNOWING YOUR TREES

By
G. H. COLLINGWOOD
$2.50

Contains more than one hundred important American trees. Actual photographs of all trees, their leaf, bark, flower and fruit, along with descriptions of their range, habits, uses and identifying characteristics, make this the outstanding tree book of today. Designed for reading convenience, it is also beautifully printed, with cover in four colors.

The oaks, the pines, the maples, the firs, the poplars, the hemlocks, the dogwoods, the spruces—these are but a few of the aristocratic American tree families included.

Cloth Bound, size 12 x 8¾ inches. *216 pages.*



AMERICAN CONSERVATION

In Picture and in Story

Edited by OVID BUTLER
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AMERICAN CONSERVATION is the story of America — its land, its resources, its people. This book brings the story of America right up to the present day.

Beginning with the story of the ages, this book presents for your knowledge and enjoyment the complete story of conservation of the organic natural resources of our country. Briefly told, with more than 200 graphic illustrations, it is a story every American should read.

Cloth Bound, size 12 x 8¾ inches. *160 pages.*

TREES

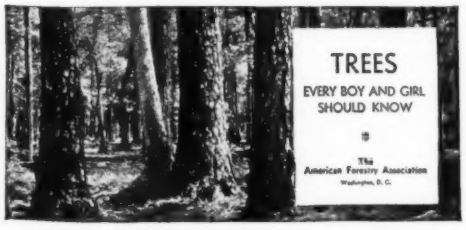
Every Boy and Girl Should Know

This book of 99 strip drawings by Calvin Fader, pictures 38 hardwoods, 38 evergreens, and in addition, 23 famous American trees, such as the Cambridge Elm, the Charter Oak, the oldest tree, the Nation's Christmas tree, etc.

Your boy or girl will thoroughly enjoy this interesting book of popular drawings.

Pocket Size 3 x 8½ inches. PRICE 50 CENTS

Write for Quantity Prices.



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An Opportunity to Pay Tribute to Fire Heroes

The American Forest Fire Medal Board recognizes outstanding cases of personal heroism in fire fighting by awarding the Forest Fire Medal. The Board consists of a representative of The American Forestry Association, Society of American Foresters, Charles Lathrop Pack Forestry Foundation, Association of State Foresters, and the National Lumber Manufacturers' Association.

In order to establish this Award on a permanent basis, a fund or foundation of not less than $3,000 is necessary. Cash balance on hand totals $2,541.17. Your assistance in completing this fund is hereby solicited. It is believed that foresters, forestry, park, and all forest protection associations, as well as other conservation groups, will welcome the opportunity to contribute. Contributions should be sent to:

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C.

WOOD DUCKS

(*Continued from page* 399)

by the Survey has a six-inch border of galvanized tin around the sides and an overlapping two-inch roof of tin. The doorway has been flattened — five inches wide, three inches high — instead of the regulation rounded entrance of former years. The new type of entrance and the tin trimmings have been designed to eliminate unwelcome visitors. Squirrels, 'coons and bull snakes, the Survey has discovered, are the greatest enemies of wood duck eggs and ducklings. The house, which is placed from twelve to sixteen feet from the ground, measures about ten inches square inside and two feet high. Each house has a four-inch thickness of sawdust, no more, no less. The Survey men were especially emphatic about the depth of this carpet thickness.

To anyone genuinely interested in raising wood ducks the Survey will furnish information on the receipt of a self-addressed stamped envelope. Address Dr. Theodore H. Frison, Chief of the Illinois Natural History Survey, Urbana, Illinois.

So there you are! You have a pond, a marsh, or a stream. You have planted preferred duck foods in the marshy nearby spots with pondweeds and marsh smartweed, adapted especially to your soil conditions. There are overhanging willows on the shore of the pond water for perches and gossiping resorts for the ducks. Bullrushes and grasses are there for cover. You have also taken the precaution to plant a mulberry tree or two, as Jack Miner has done for his ducks. You will build as many well constructed apartments as your site permits. For where one duck comes to roost another will follow. And most of all you have a distinctly worth-while new interest in life and the future.

LOST SANCTUARY

(*Continued from page* 409)

I sent to the highway to try to relay a message to the ranger. Then I ran a mile to the sawmill.

The men came as quickly as a Model-T could bring them, after they gathered the necessary tools. We found the ranger there, striving frantically to encircle a fire as big as a city lot and growing all the time. It raced through the dry needles, swooped up in flames around down timber, and blew its hot breath into the trees until they seemed like oil-saturated torches ready for a spark to set them off.

The wind began. It fanned fire into the dead twigs and needles underneath the trees. I saw the twigs smolder, then flare, and flames leap like lightning. In a moment a whole tree was ablaze and passing the demon that possessed it to its neighbors. Soon, where stately trees had waited to shelter all who came, there were gaunt black skeletons. The wind picked off the hanging embers from them and tossed them in the air.

I could hear the crash of axes, the sound of digging. I could see no one clearly for the smoke. But I could carry water, on and on and on. Suddenly there was a yell, "Across the creek;" I looked and saw new smoke. Beyond the new blaze was the thickly wooded hill. Beyond that, other hills. Between the two was the cathedral. Instantly the men struggled across the water. Nature would confine this fire, with half a chance, to a single promontory; but if the fire should reach that hill it could travel on.

Already over there it was eating into needles centuries deep. Already the wind was picking up small sparks and dropping them beyond, and one of them dropped in our cathedral.

I saw it burn—its pillars, its arches, its great green roof and spires—, not tree passing fire to tree, but all together in a hissing, cracking, roaring hell which rolled its black breath to the sky.

They defeated the demon at the willows. They had it under control, they said, tired but jubilant. It was then I learned that being "under control" meant seeing new logs blaze up suddenly, meant fire creeping underground through dry needles to break out in fresh places, meant constant vigilance. But the green hill was saved though my beloved shade of picnic hours was gone. Across the creek, rising over a blackened carpet, over the trustful hoof-prints of a fawn, was the charred skeleton of a cathedral built by God.

I never went there again. And, although our camp was safe, although lumber was stacked there ready for a cabin, we moved away. For something vital had been taken from it, a thing more poignant even than the trees. And in its place rose an ache, not alone because of the lost sanctuary; but because I had seen people like me, men who loved the beauty, peace and recreation of the woods, risk the burning of an entire forest. I had seen them set the ghastly stage, and then —in order to save their own faces—turn coward, and run away.

A Salute

TO OUR CUSTOMERS . . .

WHO HAVE HELPED OUR WAR EFFORT

- Ours—a great responsibility. We have pledged full support in the war effort and we mean to keep our word.

- A salute to our Customers who put us where we are today . . . . we are very grateful. You stood aside willingly so that our entire facilities could be directly linked to war production schedules. We sincerely regret we can not give 100% attention to your needs.

- A salute to our valued Distributors. You are doing your bit by helping our Customers extend the life of their present Galion machines.

- Finally—a big salute to those in the service, who are taking the brunt of the fighting. Our promise: Galion rollers, graders and spreaders will continue as dependable allies in the all-out effort behind the line . . . worthy tools for the men behind the men behind the guns.

• • •

careless matches aid the Axis

PREVENT FOREST FIRES!

Defending our country goes far back of just training men to fight or the building of war machines . . . it means a constant effort on our part to conserve our national resources, without which our great American industries could not function. A major step toward this goal of preserving America for Americans is our all-out effort behind the lines in preventing forest fires. Galion is happy to take part in such a campaign.

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INDIAN

FIRE PUMPS CUT FOREST FIRE LOSS

EVERY BLAZE HURTS THE NATION'S WAR EFFORT

Fires like the one described in clipping can be prevented if there are ample INDIAN FIRE PUMPS to stop them before they spread. Clear water under pressure smashes grass and brush fires fast.

Fire loss must be reduced. Communities, fire protection agencies and citizens will help their country if they are ready to act when an emergency arises. Order INDIANS now. BE PREPARED!

Forest Fire Area Under Army Law

Incendiarism Suspected

Rhode Island Blaze

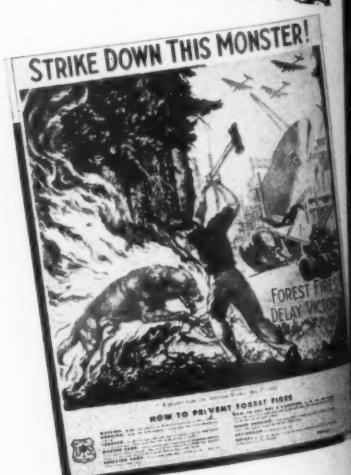
WEST GREENWICH, R. I., —Governor J. Howard McGrath declared martial law in three western Rhode Island towns today as two new forest fires broke out. A district supervisor for the Federal Department of Agriculture reported they may have been set by saboteurs.

At midmorning the loss was estimated at $2,500,000. The blaze raged out of control along a 10-mile front.

Gov. McGrath declared martial law in West Greenwich, Coventry and Scituate on advice of Adjt. Gen. Peter Leo Cannon, to give military authorities a freer hand in dealing with the emergency.

While more than 3000 soldiers, sailors and volunteers battled the blaze, new fires broke out at Bowen Hill in Coventry and at Escoheag—both points outside the immediate

"Protecting our forests from fire means helping to win the war, and helping to win the peace afterward," says Secretary of Agriculture Claude R. Wickard. "Wood is a vital material of war with vast amounts needed for hundreds of requirements. Every fire in our fields or forests is an enemy fire."



"Careless Matches Aid the Axis"—that the slogan which inspires all Americans to exert efforts to reduce fire loss. Enrollment in local units of volunteer Forest Fire Fighters Service provides an opportunity to help. We must win the battle against FIRE.

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